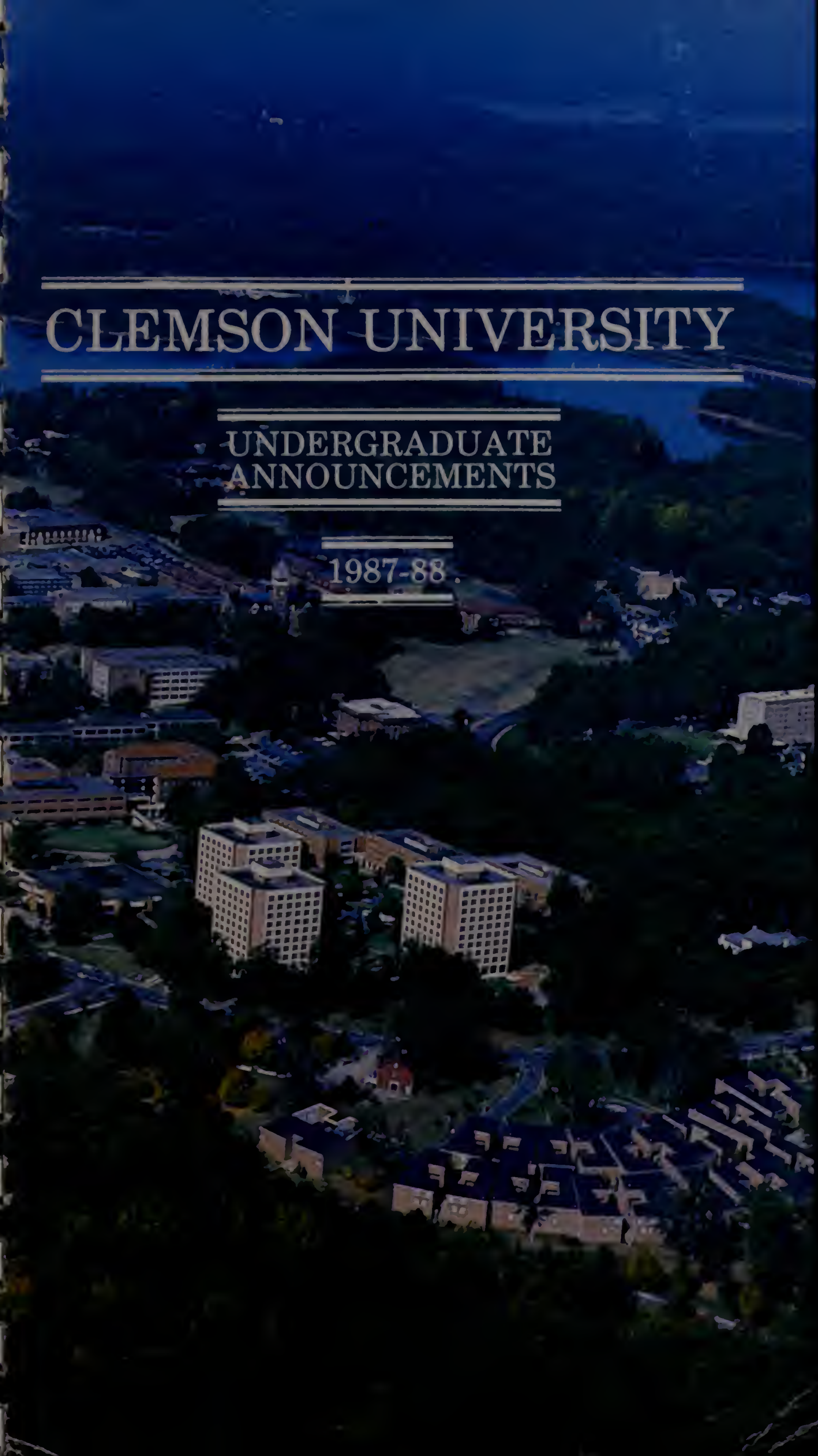
CLEMSON UNIVERSITY

UNDERGRADUATE ANNOUNCEMENTS

1987-88



The requirements for each curriculum shall be the catalog requirements in effect on the date of enrollment in that curriculum. If a student withdraws from the University and subsequently returns, the catalog requirements in effect at the time of return will control. Any variations in curricular requirements shall be considered under the substitution procedures. If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses.

Statements set forth in this catalog are for information purposes only and should not be construed as the basis of a contract between a student and Clemson University.

Clemson University
Undergraduate Announcements
1987-88

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Academic Calendar

FALL SEMESTER 1986

August 18	Orientation
August 19	Registration
August 20	Late registration
August 21	Classes begin; late registration fee
August 27	Last day to register or add a class
September 10	Last day to order diploma for December graduation
September 17	Last day to withdraw from class or the University without record
October 13	Preliminary grades due
October 27	Last day to withdraw from class or the University without final grades
October 30-31, November 5-7	Preregistration
November 3-4	Fall break
November 27-28	Thanksgiving holidays
December 8-13	Examinations
December 17	Last day to preregister for spring semester
December 18	Graduation

SPRING SEMESTER 1987

January 5	Registration; orientation
January 6	Late registration
January 7	Classes begin, late registration fee
January 13	Last day to register or add a class
January 27	Last day to order diploma for May Commencement
February 3	Last day to withdraw from class or the University without record
March 2	Preliminary grades due
March 13	Last day to withdraw from class or the University without final grades
March 16-20	Spring break
April 4	Honors and Awards Day
April 6-10	Preregistration
April 27-May 2	Examinations
May 8	Graduation

FIRST SUMMER SESSION 1987

May 18	Registration
May 19	Classes begin; late registration fee
May 20	Last day to register or add a class
May 26	Last day to withdraw from class or the University without record
June 8	Last day to order diploma for August graduation
June 10	Last day to withdraw from class or the University without final grades
June 23	Examinations

SECOND SUMMER SESSION 1987

June 29	Orientation
June 30	Registration
July 1	Classes begin; late registration fee
July 2	Last day to register or add a class
July 6	Holiday
July 9	Last day to withdraw from class or the University without record
July 11	Classes meet
July 24	Last day to withdraw from class or the University without final grades
July 31	Last day to preregister for fall
August 5	Examinations
August 8	Graduation

FALL SEMESTER 1987

August 17	Orientation
August 18	Registration
August 19	Late registration
August 20	Classes begin; late registration fee
August 26	Last day to register or add a class
September 9	Last day to order diploma for December graduation
September 16	Last day to withdraw from class or the University without record
October 12	Preliminary grades due
October 26-27	Fall break
October 28	Last day to withdraw from class or the University without final grades
November 2-6	Preregistration
November 26-27	Thanksgiving holidays
December 7-12	Examinations
December 16	Last day to preregister for spring
December 17	Graduation

SPRING SEMESTER 1988

January 4	Registration; orientation
January 5	Late registration
January 6	Classes begin; late registration fee
January 12	Last day to register or add a class
January 26	Last day to order diploma for May commencement
February 2	Last day to withdraw from class or the University without record
February 29	Preliminary grades due
March 11	Last day to withdraw from class or the University without final grades
March 14-18	Spring break
April 4-8	Preregistration
April 9	Honors and Awards Day
April 25-30	Examinations
May 6	Commencement

FIRST SUMMER SESSION 1988

May 16	Registration
May 17	Classes begin; late registration fee
May 18	Last day to register or add a class
May 24	Last day to withdraw from class or the University without record
June 9	Last day to withdraw from class or the University without final grades
June 21	Examinations

SECOND SUMMER SESSION 1988

June 27	Orientation
June 28	Registration
June 29	Classes begin; late registration fee
June 30	Last day to register or add a class
July 4	Holiday
July 7	Last day to withdraw from class or the University without record
July 9	Classes meet
July 22	Last day to withdraw from class or the University without final grades
July 29	Last day to preregister for fall
August 3	Examinations
August 6	Graduation

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General Information

Clemson is a land-grant, state-supported university, fully accredited by the Southern Association of Colleges and Schools. Curricula are accredited by Accreditation Board for Engineering and Technology, American Assembly of Collegiate Schools of Business, Computing Sciences Accreditation Board, National Architectural Accrediting Board, National Council for Accreditation of Teacher Education, National League for Nursing, and Society of American Foresters.

The sixty-seven undergraduate and one hundred graduate degree programs under the colleges of Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, Nursing, Sciences, and the Graduate School form a background of training for the hundreds of occupations and professions in which Clemson graduates engage. The University is organized on a basis whereby it retains a clear entity through the interrelationships of colleges and departments, providing a well-balanced fundamental and general educational program.

The enrollment of Clemson has grown from 446 students at the opening of the University in 1893, to 13,062 for the first semester, 1986-87. Since the opening of the University, 48,813 students have been awarded the Bachelor's degree. During this same period, 426 Associate degrees, 10,493 Master's degrees, 845 Doctor of Philosophy degrees, 9 Doctor of Education degrees, and 139 Education Specialist degrees have been awarded.

ADMINISTRATIVE ORGANIZATION

The government of the University is vested in a Board of thirteen trustees, including six elected by the legislature and seven self-perpetuating members, in accord with the Clemson will. The President of the University is the chief executive and administrative officer elected by the Board of Trustees; and under the President there are eight areas of administration, each headed by a chief administrative officer responsible to the President. The organizational units under each of these officers are outlined as follows:

I. Provost and Vice President for Academic Affairs
  A. Undergraduate Studies
    1. Honors Programs
    2. Summer Sessions and Career Workshops
    3. University Library
  B. Graduate School
  C. University Research

- D. Colleges
    1. Agricultural Sciences
    2. Architecture
    3. Commerce and Industry
    4. Education
    5. Engineering
    6. Forest and Recreation Resources
    7. Liberal Arts
    8. Nursing
    9. Sciences
- E. Institutes
    1. The Belle W. Baruch Forest Science Institute
    2. Housing Institute
    3. Water Resources Research Institute
    4. Strom Thurmond Institute
- F. Division of Computing and Information Technology
    1. Computer Center
    2. Administrative Programming Services
    3. Information Systems Development

II. Vice President for Administration and Secretary of the Board of Trustees
- A. Human Resources
- B. Internal Auditings
- C. Magistrate's Office
- D. Parking and Vehicle Registration
- E. Public Safety

III. Vice President and Vice Provost for Agriculture and Natural Resources
- A. Agricultural Research
- B. Cooperative Extension Service
- C. College of Agricultural Sciences
- D. College of Forest and Recreation Resources
- E. Livestock-Poultry Health
- F. Regulatory and Public Service

IV. Vice President for Business and Finance
- A. Budgets and Planning
- B. Business Management
- C. Facilities, Planning, and Management
- D. Financial Management
- E. Personnel Division

V. Vice President for Institutional Advancement
- A. Alumni Relations
- B. Administrative Services
- C. Alumni Publications
- D. Development and Campaign Programs
- E. Major and Planned Giving
- F. Coordinator for Gift Clubs
- G. Donor Research

- H. University Relations and Visitors Program
- I. Agricultural Communications
- J. Publications and Graphics
- K. Electronic and Photographic Services
- L. News Services

VI. Vice President for Student Affairs and Dean of Students
- A. Admissions, Registration, and Financial Aid
- B. Athletic Department
- C. Bookstore and Canteens
- D. Career Services
- E. Counseling and Career Planning
- F. Housing
- G. Littlejohn Coliseum
- H. Music Activities
- I. Student Health Service
- J. Student Life
- K. Student Union

VII. University Counsel

VIII. Public Affairs

ADMISSIONS

Beginning Freshmen To receive consideration for admission to Clemson, candidates must submit a high school transcript through their counselor and have results of the Scholastic Aptitude Test (SAT) sent directly from the College Board in Princeton, New Jersey.

Beginning in the fall 1988, all South Carolina public senior colleges and universities will require applicants for freshman admission to have completed the following courses in high school:

English Four credits are required, including grammar and composition components, at least one in English literature, and at least one in American literature. Completion of college preparatory English I, II, III, and IV will meet these requirements.

Social Studies Three credits are required, including one credit in U.S. History, one-half credit in economics, one-half credit in government, and one credit in an additional social studies.

Mathematics Three credits are required, including Algebra I and II. Geometry is strongly recommended as the required third unit. A fourth unit is recommended but not required.

Laboratory Science Two credits are required, including at least one unit each of two laboratory sciences chosen from biology, chemistry, or physics. A third unit of a laboratory science is strongly recommended.

Foreign Language Two credits from the same foreign language are required.

Other One credit is required in advanced mathematics or computer science or a combination of these; or in world history, world geography, or Western civilization. One credit in physical education or ROTC completes the sequence of required courses.

The examination scores, rank in class, academic preparation, and recommendation of the high school counselor will be weighed carefully in the decision-making process. The applicant's acceptance will be confirmed upon presentation of a final high school transcript indicating a continuation of progress and graduation.

Transfer Candidates All transfer applicants must have original transcripts of their records sent to Clemson directly from each college or university attended. Unless so stated on the transcript, the candidate should present statements of honorable dismissal and of eligibility to return to the institution last attended. Generally, only candidates who have accumulated 30 semester (45 quarter) hours of work with a cumulative average of C+ will be considered for admission. SAT scores are required of some transfer students, and high school transcripts may be required in a few instances. Candidates concerned will be notified individually if either or both of these credentials are needed.

All Applicants Various nonintellective factors will be considered in cases where it is impossible to make a positive decision on the basis of SAT scores and previous academic performance alone.

Special Student Status The special student classification is designed for high school graduates or persons at least 19 years of age who have no interest in pursuing a degree. It is not a "trial admission" status or one for candidates who apply too late to submit credentials for consideration for regular admission. Applicants denied regular admission to Clemson are not eligible to apply as special students.

None of the usual credentials supporting an application are required of such applicants. A maximum of 15 undergraduate credit hours can be taken during the regular semester or summer sessions. Although it is possible to enroll in the immediately succeeding semester until the cumulative maximum of 15 credit hours is taken, students must submit a new application for each entrance period. Moreover, preregistration is prohibited, inasmuch as regular Clemson students have priority for enrollment in all courses.

Application Forms and Dates Application forms may be obtained by writing to the Office of Admissions, Clemson University, Clemson, South Carolina 29634-4019. Application forms and catalogs for all 1988 entry dates are available beginning September 1987. Preliminary application forms are available anytime for those who wish to be included in the September mailing, and freshman candidates are especially encouraged to submit preliminary applications and sit for the Scholastic Aptitude Test (SAT) during the spring semester of their junior year.

There is no established application deadline for submitting the necessary credentials. However, candidates should understand that admission is closed when all classroom space has been committed. Although the time of application does not specifically control the time one receives a decision, the majority of freshman admission decisions are reached during the period November through March. Transfer students seeking entrance in August usually are notified between February and July.

Application Fee Candidates must submit a nonrefundable fee of $15 with their applications. This fee is not applicable toward tuition and/or other University fees.

Housing Applications Forms for requesting University housing are enclosed with applications for admission but must be returned directly to Housing, as the two applications are processed by separate offices. Upon receipt of a request, Housing Office personnel will forward further information and contracts in the order in which the requests are received. Once all facilities appear to be committed, students will be notified that their names have been added to the waiting list.

Candidates receiving housing contracts must complete and return the form with a $75 housing deposit in accordance with the due date stated. Those returning these items who subsequently are accepted for admission are guaranteed housing. The $75 deposit will be refunded to students who reserved housing but are denied admission to the University

University housing is limited and cannot be guaranteed to all entering students. New freshmen have priority over transfer students for the fall semester. Housing packets are sent out on a first-come, first-served basis as the applications are received.

Entrance Examinations All freshman candidates and some transfer students must submit scores for the SAT. A student transferring from an accredited college usually need not submit SAT scores if he has earned thirty or more transferable semester hours with a C+ or greater average, based on a system using four passing grades. Those enrolled in technical programs at technical and community colleges usually will be required to submit SAT scores.

For August enrollment, it is recommended that students complete the SAT no later than the preceding December.

Candidates who have completed the required tests previously may have their scores reported to Clemson by directing a request to the College Board. Others may secure a *College Board Student Bulletin* and an application for the tests from their local high school or from the Board's Office, CN 6200, Princeton, New Jersey 08541-6200. *Copies of student reports and those submitted by third parties, such as high schools and colleges, are not acceptable.*

College Board Achievement Tests For academic placement, the majority of prospective freshmen are required to take at least one College Board Achievement Test: Mathematics, Level II. Although most decisions are reached without benefit of achievement test results, these scores sometimes improve one's chances for admission. For applicants attending a high school that does not compute class rank or a highly selective private school, in addition to Mathematics, Level II, it may be helpful to take English and one other achievement test by January of the senior year.

Mathematics For students beginning in curricula that require MTHSC 101, 102, or 106 or those majoring in Prephysical Therapy, the College Board Mathematics Achievement Test, Level II is required. The College Board Advanced Placement (AP) examination in Calculus is the only recognized substitute. Failure to sit for one of these tests will result in placement in remedial work that will not apply toward mathematics requirements.

Language Applicants desiring advanced placement in a foreign language may take the College Board's Achievement Test, the Advanced Placement Examination, or a test administered during summer orientation by the Department of Language at Clemson. Advanced placement on the basis of an achievement test begins with a score of 450 or higher and enables a student to exempt one or more semesters, depending on the score earned. Credit will be awarded after completion of a higher-level (qualifying) course at Clemson with a grade of C or better.

Credit by Examination Students may receive college credit by completing one of the following examinations:

Advanced Placement Program The College Board Advanced Placement Program (AP) provides an opportunity for highly motivated high school students to begin their college careers during the last year or two of high school. The growth in AP has increased steadily at Clemson where more than one-third of recent freshman classes have participated in the program with more than three-fourths of these achieving the necessary scores to receive credit for one or more courses.

AP participants take college-level courses taught in their high schools, sit for nationally administered examinations in the subjects concerned, and submit test scores to Clemson for credit for graduation. Credit is awarded to those earning scores of 3, 4, or 5 on the AP examinations.

College Board College-Level Examination Program (CLEP) This program has very limited recognition at Clemson. A few departments accept credit for CLEP subject-matter examinations; however, CLEP General Examinations are not recognized. Credit is awarded for introductory-level courses according to criteria established by the following departments: Chemistry, English (composition only), and Mathematical Sciences (algebra and trigonometry only—applicable principally in agricultural curricula permitting use of MTHSC 105). Numerical scores plus essays, required when offered as part of a CLEP examination, will be evaluated by the appropriate department. CLEP was designed primarily for adults with nontraditional learning experiences; it is not generally appropriate for freshmen.

Transfer Credit Work completed at other accredited institutions with a grade of C or higher will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at another institution will be accepted for transfer and use in Clemson curricula. The acceptability of each course will be based on an evaluation by the faculty concerned and will be managed by the admissions staff.

Students transferring may select the curriculum that was outlined in the *Clemson University Announcements* at the time they entered the sending institution, provided that they have been in continuous enrollment. Further, transfer students may select any curriculum adopted subsequent to that initial curriculum. After enrolling at Clemson, if transfer students change from one major to another, they will complete all of the requirements included in the new curriculum that are in effect at the time of the change. Transfer students who take more than five years from the date of initial enrollment at the sending institution to graduate may be required to take additional coursework.

Campus Visits and Tours The University Visitors' Center, located in Tillman Hall, is open Monday through Friday from 8:00 a.m. to 5:30 p.m., Saturday from 10:00 a.m. to 4:00 p.m., and Sunday from 2:00 p.m. to 5:30 p.m. The Center is closed on selected holidays.

Guided walking tours are available from the Visitors' Center on Monday through Saturday at 10:00 a.m. and 2:00 p.m., Monday and Friday at 4:00 p.m., and Sunday at 2:00 p.m. (When classes are not in session, only one guided tour will be given—Monday through Friday at 2:00 p.m.) Thirty-five minute cassette self-guided tours are also available. For additional information, call (803) 656-4789.

Prospective students are also welcome to visit and talk with the staff, faculty, and students of the University. Visits can be made to the Admissions Office without an appointment during regular office hours Monday through Friday, 8:00 a.m. to 4:30 p.m. It is best to avoid visiting the campus during the last two weeks of August and the first week of January, as these are class registration periods. The staff and faculty cannot always assist visitors at these times.

Candidates for the College of Architecture are particularly encouraged to come for an interview. Prospective students will have an opportunity to discuss the programs offered with a faculty member and tour the facilities. Appointments should be made in advance by contacting that College.

Interviews are not required in considering candidates, nor will the results of interviews affect admissions decisions. Rather, the purpose is to provide candidates the opportunity to learn more about the University, the programs, and admission procedures.

Orientation Program The University has scheduled a series of two-day orientation programs during the summer months for entering freshmen, transfer students, and their parents. All accepted students are expected to attend one of these sessions.

During orientation students will have an opportunity to discuss their educational objectives with an adviser, to preregister for the fall semester, and to learn about student life. Transfer students have their transcripts evaluated and select appropriate courses for their first semester at Clemson. Those transferring may find it difficult to schedule the appropriate courses if they fail to attend one of the first six orientation periods. The dates for orientation in 1987 are as follows:

June 15, 16[1]
June 18, 19
June 29, 30[1]
July 2, 3
July 9, 10[1]
July 16, 17
August 16, 17[2]

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[1] Good choice for transfer students as well as freshmen.

[2] The program on this date is abbreviated, and it is especially inappropriate for transfer students. Only foreign students and American students living great distances from the University should defer orientation until this time.

Students from Other Countries A limited number of well-qualified students from other countries are accepted. The student should file a preliminary application and take the College Board's Scholastic Aptitude Test (SAT) and Test of English as a Foreign Language (TOEFL). After one's scores are reported to Clemson, admissions personnel will make a preliminary evaluation and, if appropriate, send a formal application to the candidate. Complete transcripts of secondary and college-level academic work are required, and instructions concerning submission will be included with the formal application.

ADMISSION OF POST-BACCALAUREATE STUDENTS

A student may be accepted by the Graduate School as a post-baccalaureate student if he/she applies to a specific graduate degree program but does not have the appropriate academic background. Such a student must be recommended by the appropriate department or program chairperson and must fully meet all other requirements for admission to the particular degree program with respect to grade-point ratio and standardized test scores. A student in this category who is denied admission because of failure to meet the minimum requirements has access to the same appeal procedures as does any other student applying to the Graduate School.

Applicants will be classified as post-baccalaureate students if they are not qualified to take at least one graduate course per semester which can be included in the minimum hours required for the graduate degree. Additionally, any student required to complete more than eighteen semester hours of undergraduate credits will be classified as post-baccalaureate. Until such time that the required number of undergraduate credit hours is less than or equal to eighteen and the student is qualified to take, each semester, a graduate course which can be included in the minimum hours required for the graduate degree, he or she will remain classified as post-baccalaureate. A department or a student may request post-baccalaureate status even though the above criteria are satisfied.

At the time a post-baccalaureate student becomes eligible for classification as a graduate student, the decision as to eventual admission status (full or provisional) will be made according to criteria utilized by the department and Graduate School for all other applicants to the particular degree program. The post-baccalaureate student is expected to maintain a B average and receive no grade lower than C in order to qualify for admission to a graduate program.

Post-baccalaureate students may enroll in the same number of credits per semester as any undergraduate student but shall not enroll in graduate courses or receive a graduate assistantship. No degree or certificate shall be awarded to students in a post-baccalaureate status and such students who subsequently desire to obtain an additional baccalaureate degree must apply through the Office of Admissions and Registration. The applicability of credits earned toward the undergraduate degree will be determined by the policy pertaining to transfer students. Tuition and fees for post-baccalaureate students shall be those applicable to undergraduates with the exception of the application fee and admissions deposit.

A student possessing an undergraduate degree or a graduate degree and who wishes to enroll in specific undergraduate courses for reasons other than future admission to the Graduate School shall not be classified as post-baccalaureate and shall be governed by policies established by the Office of Admissions and Registration.

READMISSION OF FORMER UNDERGRADUATE STUDENTS

Students who previously have attended Clemson and who wish to return must secure an application for reentrance from the Registrar's Office. Students who have attended another institution while away must submit an official transcript from that institution. Readmission to the program which the student was previously enrolled is not always automatic. An interview may be requested by the department.

GRADUATE STUDY

Programs leading to graduate degrees from Clemson University are available in nine colleges—Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, Nursing, and Sciences.

For information concerning advanced degrees see *The Graduate School Announcements* which may be obtained from the University Graduate School.

EXPENSES

Establishment of University Fees The annual State Appropriation Act imposes the general requirement that student fees be fixed by the University Board of Trustees. The Act imposes two specific requirements on the Board: (1) In fixing fees applicable to academic and general maintenance and operation costs, the Board must maintain a minimum student fee not less than the fee charged the previous year. (2) In fixing fees applicable to dormitory rental, dining halls, laundry, infirmary, and all other personal subsistence expenses, the Board must charge students an amount sufficient to fully cover the cost of providing such facilities and services.

Settlement of University Fees The Schedule of Semester Charges for all undergraduate students—full or part time, and auditing—is shown on the pages which follow. Satisfactory settlement of all expenses is a requirement for completing each semester's class registration, and no student is officially enrolled until all past due accounts have been satisfied. In special cases the University will accept, at the beginning of a semester, a noninterest-bearing promissory note for a portion of the semester residence-hall rent and semester-plan board fee. Amounts up to $245 for room rent, $250 for 5- or 7-day board fee, and $130 for the lunch plan only may be included in the note. In such cases, a note for the fall semester charges will be due October 1, and for the spring semester, March 1. Failure to pay the note when due will result in the denial of future deferred payment note privileges and termination of board plan and/or cancellation of housing contract.

A $75 advance payment of room rent is required for a room reservation for the fall semester. Currently enrolled students who expect to continue enrollment are given an opportunity to make room reservations and pay the $75 during the spring semester at a time designated by the Housing Office. New students who desire residence hall accommodations are to pay the $75 advance payment of room rent and the $80 admissions deposit when they accept the University's offer of admission. The $75 advance payment of room rent and the $80 admissions deposit are deducted from the amount otherwise due for the first semester expenses.

All checks and money orders should be made payable to Clemson University. Any check given in payment of University expenses which is returned unpaid by the bank immediately creates an indebtedness by the student to the University.

Returned Checks A personal check given in payment of University expenses that is returned unpaid by the bank immediately creates an indebtedness to the University and jeopardizes continued enrollment. The Office of Financial Management, G-08 Sikes Hall, administers matters related to returned checks for the University. A $10 service charge will be made by the University on returned checks. The student who cashes a two-party check will be held responsible for that check.

Students will be notified by letter regarding returned checks. For returned checks for tuition and fees, failure to respond to notification within 15 days or failure to make payment within 15 days will result in disenrollment. For returned checks for other than tuition and fees, failure to respond to notification or make payment within 15 days may result in referral to the University magistrate for legal action. Any returned check not collected through the above procedures may be turned over to a collection agency. In cases where tuition and fees have been paid with a check returned unpaid, the University may restrict subsequent payments for tuition and fees by accepting only cash, certified check, or money order.

SCHEDULE OF SEMESTER CHARGES

Actual charges for 1987-88 are not known when the catalog is printed. The charges reflected below are for 1986-87 and are subject to change as conditions warrant.

	Full-Time S.C. Resident or Graduate Student (Twelve or more hours)	*Full-Time Nonresident (Twelve or more hours*
Tuition	$ 25.00	$ 100.00
Matriculation Fee (nonrefundable)	5.00	5.00
University Fee	861.00	2,060.00
Medical Fee	70.00	70.00
Semester Total (Excluding Room and Board)	$961.00	$2,235.00

Residence Halls	
Johnstone (Sections A-F)	$490.00
Benet, Bowen, Bradley, Cope, Donaldson, Geer, Johnstone (Annexes A, F), Norris, Sanders, Wannamaker, Young	$525.00
Barnett, Byrnes, Lever, Manning, Mauldin, Smith	$580.00
Clemson House	
Room (two occupants)	$590.00
Apartment with kitchenette (three or four occupants)	$615.00
Thornhill Village (four occupants)	$645.00
Calhoun Courts Apartments (four occupants)	$735.00
Board	
Five-Day Plan (Monday through Friday)	$495.00
Seven-Day Plan (Monday through Sunday)	$570.00
Lunch Only (Monday through Friday)	$255.00

Full-time Undergraduate Students must be enrolled in 12 semester hours to have full-time status. Students enrolled for less than 12 hours, or who drop below 12 hours may become ineligible for some student services, financial aid, or other beneficial programs.

Part-time Undergraduate and Graduate Students taking less than 12 semester credit hours will be charged each semester according to the following schedule. These fees do not provide for admission to athletic events, concert series, and other such activities.

	S.C. Residents or Graduate Students	*Nonresidents*
Matriculation Fee (nonrefundable)	$ 5.00	$ 5.00
Tuition (per semester hour)	$ 2.00	$ 8.00
University Fee (per semester hour)	$ 66.00	$154.00
University Staff		
Matriculation Fee (nonrefundable)		$ 5.00
Tuition (per semester hour)		$ 1.00
University Fee (per semester hour)		$ 33.00
Graduate Assistants Fee	$300.00	
Auditing		
Tuition (per semester hour)	$ 1.00	$ 4.00
University Fee (per semester hour)	$ 33.00	$ 77.00

Past Due Accounts Any indebtedness to the University which becomes past due immediately jeopardizes the student's enrollment, and no such student will be permitted to reenroll for an ensuing semester or summer school term. Further, any student who fails to pay all indebtedness to the University may not be issued a transcript or diploma.

Refund of Academic Fees (Tuition, University Fee, and Medical Fee) for Students Withdrawing, Dropping to Part time, or Part-time Students Dropping Credit Hours No refunds will be made on a semester's tuition and fees after four weeks from the last day to register. In the case of a withdrawal from the university, refunds will be based on the date the Schedule Change Form is returned to the Registrar's Office. To be eligible for a refund, the student's request must be received by the Office of Financial Management prior to the beginning of the next fall/spring semester. Beginning with the day following the last day to register, refunds for periods of four weeks or less during a semester shall be made on the following basis:

Period of Enrollment After the Last Day to Register	*Percent Refunded*
One week or less	80%
More than 1 but not more than 2 weeks	60%
More than 2 but not more than 3 weeks	40%
More than 3 but not more than 4 weeks	20%
More than 4 weeks	0%

Refund of Dining Hall and Residence Hall Fees Specific information relating to living-expense refunds is given in the sections on Housing and Student Food Service.

Refunds of Financial Aid for Students Withdrawing from the University Refunds for academic fees will be made in accordance with the semester and summer session refund policies. University housing refunds will be made in accordance with the housing contract. Refunds for meal plans will be made on pro rata basis.

Since Financial Aid is expected to meet or help meet educational costs, any academic fee, housing, or meal-plan fee for students withdrawing from the University, up to the amount of financial aid received for that semester or summer session, will be refunded to the Financial Aid Program(s) from which the student received assistance.

To determine the amount of refund that will be returned to Federal Title IV Aid Programs and what amount will be returned to the non-Title IV Aid Programs, the following formula will be used:

$$\text{Federal Title IV Refund} = (\text{Amount of Refund}) \times \frac{\text{Title IV Aid Received}}{\text{Total Aid Received}}$$

Non-Title IV Refund = Amount of Refund minus Title IV Refund

In refunding monies to the various Financial Aid Programs, the following priority listings will be used.

A. Title IV Programs
   1. National Direct Student Loan Program (NDSL)
   2. Supplemental Educational Opportunity Grant (SEOG)
   3. Guaranteed Student Loans (GSL)/Plus Loans
   4. Pell Grant

B. Non-Title IV Programs
   1. Institutional Loans
   2. Institutional Scholarships and/or Grants
   3. Private Loans/Scholarships

After the refund has been applied to Title IV and non-Title IV programs, any refund balance will be refunded to the student.

If debts were incurred before withdrawing, such as bad checks, unpaid traffic fines, library fines, and others, the refund will cover these obligations first.

Academic fees, housing, and meal-plan refunds for students not withdrawing will be paid to the student.

Late Registration Service Charge Registration for classes is scheduled for specific days, and certain definite procedures are outlined to prevent or reduce the problems incident to late registration. A student has not completed registration until all required steps have been taken, the final being the return of the registration form, and if not preregistered for classes the properly signed class registration card to the Office of Admissions and Registration. Any student failing to complete registration on the specified class registration days will incur a service charge.

Books and Supplies The cost of books is not included in the Schedule of Semester Charges. Books and supplies at the beginning of the semester will be approximately $125-$200.

Transcripts Requests for transcripts should be directed to the Office of Admissions and Registration. Each official transcript is $2.

RESIDENT TUITION AND FEES

Proof— Any student or prospective student whose status concerning entitlement to payment of in-state tuition and fees is questionable has the responsibility of securing a ruling from the University by providing on special forms all relevant information. These forms can be obtained from the office of the Dean of Admissions and Registration and are to be completed and returned to that office at least two weeks prior to registration for any semester for which the student desires to pay the in-state rate.

Entitlement— Eligibility for payment of in-state tuition and fees shall be determined under the provisions of Section 59-101-70, South Carolina Code of Laws, 1976, as amended (Act No. 466). This law is set forth in its entirety as follows (subject to further amendment by the General Assembly).

Definitions— Section 1. As used in this act:

A. The words "State Institution" shall mean those post-secondary educational institutions under the jurisdiction of the following: (1) Board of Trustees, Clemson University; (2) Board of Trustees, Medical University of South Carolina; (3) Board of Trustees, South Carolina State College; (4) State College Board of Trustees; (5) Board of Visitors, The Citadel; (6) Board of Trustees, University of South Carolina; (7) Board of Trustees, Winthrop College; and (8) State Board of Technical and Comprehensive Education.

B. The word "student" shall mean any person enrolled for studies in any State institution.

C. The word "residence" or "reside" shall mean continuous and permanent physical presence within this State, *provided,* that temporary absences for short periods of time shall not affect the establishment of a residence.

D. The word "domicile" shall mean a person's true, fixed, principal residence and place of habitation; it shall indicate the place where such person intends to remain, and to which such person expects to return upon leaving without establishing a new domicile in another state. For purposes of this section one may have only one legal domicile; one is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for students at State Institutions shall be presumed not to be a place of principal residence, as residency in such housing is by nature temporary.

E. The words "in-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are domiciled in South Carolina in accordance with this act; the words "out-of-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are not domiciled in South Carolina in accordance with this act.

F. The words "independent person" shall mean a person in his majority, or an emancipated minor, whose predominant source of income is his own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loan, or payments of alimony or separate maintenance made pursuant to court order.

G. The words "dependent" or "dependent person" shall mean one whose financial support is provided not through his own earnings or entitlements, but whose predominant source of income or support is payments from a parent, spouse, or guardian and who qualifies as a dependent on the federal tax return of the parent, spouse or guardian; *provided,* however, that the words "dependent" or "dependent person" shall not include a person who is the recipient of alimony or separate maintenance payments pursuant to court order.

H. The word "minor" shall mean a person who has not attained the age of eighteen years; and the words "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor.

I. The word "parent" shall mean a person's natural or adoptive father or mother; or if one parent has custody of the child, the parent having custody; or if there is a guardian or other legal custodian of such person, then such guardian or legal custodian; *provided,* however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect.

J. The word "spouse" shall mean the husband or wife of a married person.

Tuition and Fees for Residents of State— Section 2. South Carolina domicile for tuition and fee purposes shall be established as follows in determinations of rates of tuition and fees to be paid by students entering or attending State Institutions:

A. Independent persons who reside in and have been domiciled in South Carolina for a period of no less than twelve months with an intention of making a permanent home herein, and their dependents, may be considered eligible for in-state rates

B. Independent persons who reside in and have been domiciled in South Carolina for fewer than twelve months but who have full-time employment in the State, and their dependents, may be considered eligible for in-state rates for as long as such independent person is employed on a full-time basis in the State

C. Where an independent person meeting the provisions of Section 2 B above, is living apart from his spouse, or where such person and his spouse are separated or divorced, the spouse and dependents of such independent person shall have domiciliary status for tuition and fee purposes only under the following circumstances:

(1) if the spouse requesting domiciliary status for tuition and fee purposes remains domiciled in South Carolina although living apart or separated from his or her employed spouse

(2) if the dependent requesting domiciliary status for tuition and fee purposes is under the legal custody or guardianship, as defined in Section 1 I above, of an independent person who is domiciled in this State; or if such dependent is claimed as an income tax exemption by the parent not having legal custody but paying child-support, so long as either parent remains domiciled in South Carolina.

D. The residence and domicile of a dependent minor shall be presumed to be that of the parent of such dependent minor

When Residency Changes— Section 3. When the domicile of a student or of the person upon whom a student is financially dependent changes after enrollment at a State Institution, tuition charges shall be adjusted as follows:

A. Except as provided in Section 2 B above, when domicile is taken in South Carolina, a student shall not become eligible for in-state rates until the beginning of the next academic session after expiration of twelve months from date of domicile in this State.

B. When South Carolina domicile is lost, eligibility for in-state rates shall end on the last day of the academic session in which the loss occurs; however, application of this subsection shall be at the discretion of the institution involved

C. Notwithstanding the other provisions of this section, any dependent person who has been domiciled with his family in South Carolina for a period of not less than three years immediately prior to his enrollment may enroll in a state-supported institution of higher learning at the in-state rate and may continue to be enrolled at such rate even if the parent, spouse, or guardian upon whom he is dependent moves his domicile from this State

Effect of Marriage— Section 4 Except as provided in Section 2 above, marriage shall affect determinations of domicile for tuition and fee purposes only insofar as it operates to evince an intention by the parties to make a permanent home in South Carolina

Military Personnel and Their Dependents— Section 5. Notwithstanding other provisions of this act, during the period of their assignment to duty in South Carolina members of the armed services of the United States stationed in South Carolina and their dependents may be considered eligible for in-state rates. When such armed service personnel are ordered away from the State, their dependents may continue for an additional twelve months to have this eligibility at the State Institutions where they are enrolled at the time such assignment ends. Such persons and their dependents may be considered eligible for in-state rates for a period of twelve months after their discharge from the armed services even though they were not enrolled at a State Institution at the time of their discharge, if they have evinced an intent to establish domicile in South Carolina and if they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge.

Exceptions— Section 6. Full-time faculty and administrative employees of State Institutions, and the spouses and children of such persons, shall be excluded from the provision of this act.

Rates May Be Abated for Nonresidents on Scholarship— Section 7. Notwithstanding other provisions of this act, the governing boards listed in Section 1 A above, are authorized to adopt policies for the abatement of any part or all of the out-of-state rates for students who are recipients of scholarship aid.

Administration of Act—Duties of Students— Section 8. Each State Institution shall designate an official to administer the provisions of this act. Students making application to pay tuition and fees at in-state rates shall have the burden of proving to the satisfaction of the aforesaid officials of State Institutions that they have fulfilled the requirements of this act before they shall be permitted to pay tuition and fees at such rate.

Penalties for Willful Misrepresentations— Section 9. Where it appears to the satisfaction of officials charged with administration of these provisions that a person has gained domiciliary status improperly by making or presenting willful misrepresentations of fact, such persons shall be charged tuition and fees past due and unpaid at the out-of-state rate, plus interest at a rate of eight percent per annum, plus a penalty amounting to twenty-five percent of the out-of-state rate for one semester; and until these charges have been paid no such student shall be allowed to receive transcripts or graduate from any State Institution.

Regulations— Section 10.* The Commission on Higher Education may prescribe uniform regulations for application of the provisions of this act and may provide for annual review of such regulations.

EDUCATIONAL BENEFITS FOR VETERANS AND WAR ORPHANS

The Veterans Administration provides educational assistance for veterans and children of deceased or totally disabled veterans who meet requirements of applicable laws and regulations. Any veteran or child of a deceased or totally disabled veteran should communicate with the nearest Veterans Administration Office to determine whether or not he is entitled to any educational benefits

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*Regulations may be obtained from the Office of Admissions and Registration.

CLEMSON UNIVERSITY FOUNDATION

The Clemson University Foundation is a nonprofit organization which solicits, manages, and administers gifts made from private sources to the academic programs at Clemson University

Originally chartered in 1933, it was restructured in 1984 to more effectively serve the overall Institutional Advancement program at the University

There are 29 voting members of the Board of Directors who oversee the Foundation's activities. At least 16 of the 24 elected directors are alumni of the University. Other voting directors include a member of the University Board of Trustees appointed by its Chairman, the president and past president of the Clemson University Alumni Association and the president and the vice president of IPTAY. The president of Clemson University and the vice president for Institutional Advancement serve as ex-officio directors.

The Foundation operates with a heavy emphasis on an effective committee structure that reports through an executive committee to the full board. A financial division includes committees that direct their attention to real estate, investments, and special projects. A fund-raising division—the Development Council—oversees committees responsible for the Loyalty Fund; deferred gifts; club-level giving; capital gifts; foundation solicitation; and school, college, and unit fund-raising activity. Working directly with the executive committee is a policy and bylaws committee and a nominating committee.

Assets of the foundation as of June 1986 were approximately $16 million.

CLEMSON ALUMNI ASSOCIATION

The Clemson Alumni Association has been recognized on numerous occasions over its history as one of the top such organizations in the country. Alumni of the Institution have consistently participated in the University's Loyalty Fund at a level equal to twice the national average for peer institutions. In 1980 the Alumni Association was cited by the Council for the Advancement and Support of Education as the best among public institutions in sustained support of the annual giving program.

The Association stresses service to its 45,000-plus alumni and to a student body of 12,000. Regular programs designed to strengthen the high loyalty and great interest that alumni have in their Alma Mater are conducted both on and off the campus. Some 65 Clemson Club chapters are located throughout the United States, and Clemson graduates are located in every state and in foreign countries throughout the world.

All functions and services of the National Clemson Alumni Association are coordinated out of offices located in the Clemson Alumni Center, a campus centerpiece that was built, furnished, and equipped entirely by gifts from alumni, especially for that purpose. Accurate records of addresses, employment, and biographical information are kept on alumni of the Institution as well as on thousands of former students who express a desire to be involved with the University and its alumni program.

A regular publication program keeps active alumni, friends, and parents aware of what Clemson is doing through its outstanding programs in teaching, research, and public service. *The Clemson World* magazine is published quarterly and has been selected as one of the ten best alumni magazines in the country by the Council for the Advancement and Support of Education.

Traditional programs such as the Alumni Professorships, the R. F. Poole, Frank Jervey, and Alumni Presidential Scholars programs; and awards for distinguished teaching, outstanding research, and high public service are recognized as the most prestigious of their kind on campus. Alumni are continually involved in developing new sources of support for the educational programs of the University.

RESERVE OFFICERS TRAINING CORPS

The Departments of the Army and the Air Force both maintain ROTC units at Clemson University. Their mission is to produce officers of high quality to pursue both technical and nontechnical careers in the U.S. Army and Air Force. Both two- and four-year programs are available. The four-year program consists of the basic course for freshmen and sophomores and the advanced course for juniors and seniors.

Scholarships are available to selected ROTC students. Each scholarship pays for tuition, books, and laboratory expenses, in addition to $100 per month during the school year. Nonscholarship advanced cadets also receive $100 per month. Basic course credit may be awarded to students having one or more years of military service.

In 1984, the Air Force Detachment at Clemson University was selected as the best in the Nation.

Selected advanced Army and Air Force cadets receive flight training at government expense.

Cadets who complete the Advanced or Professional Course are appointed Second Lieutenants. Ample opportunity exists for graduate study in both services, with temporary deferments possible.

HISTORY

It was the fall of the year and likely one of those blustery days as the horse-drawn carriage slowly rolled to a stop on a Pendleton road in 1886.

The driver, a tall, distinguished-looking man in his late 70's peered from the carriage as if looking for someone he knew. Soon, another man approached the carriage, exchanged greetings with the first, and the two men—Thomas Green Clemson and Benjamin Ryan Tillman—drove away together toward historic Fort Hill, a plantation some four miles away and the former homestead of John C. Calhoun, Clemson's late father-in-law.

Mr. Clemson had invited Senator Tillman to his home to discuss their mutual conviction that South Carolina needed a separate college devoted to industrial and scientific education. At Fort Hill, they met with Colonels D. K. Norris and R. W. Simpson. There the four "spent nearly the whole day in talking over the new project which Mr. Clemson had in mind and which he unfolded to us," Tillman later wrote.

Perhaps the most significant result of this conference was Mr. Clemson's decision to change a will he had made three years earlier and to execute a new will so as to serve better the great purpose which he had had in mind for many years.

Although his will of 1883 sought to provide for establishment of a scientific institution upon the Fort Hill place, Mr. Clemson later decided that his intention and purpose as stated in that will might be misunderstood.

In his new will, executed November 6, 1886, Mr. Clemson wrote that he desired to make his purpose plain and to make some other changes in the disposition of his property. He clearly explained the nature and purpose of his proposed institution, the establishment of which "is now the one great desire of my life."

"It should afford thorough instruction in agriculture and the natural sciences connected therewith; it should combine, if practicable, physical and intellectual education, and should be a high seminary of learning in which the graduate of the common schools can commence, pursue and finish the course of studies terminating in thorough, theoretic and practical instruction . . ."

The first item of the new will concerned disposition of the 814 acres of the Fort Hill place and was largely taken from the 1883 will.

The will gave to the State all that part of the Fort Hill Estate inherited by Mrs. Clemson (the former Anna Maria Calhoun who died in 1875, thirteen years before her husband) from her mother and the bulk of Mr. Clemson's other real and personal property. The latter amounted to a sum which, considering the purchasing power at the time, probably has been only a few times exceeded in a public benefaction in South Carolina.

Mr. Clemson's will also provided for a seven-member Board of Trustees that would govern and manage the new institution. Named were Colonels Simpson and Norris, M. L. Donaldson, R. E. Bowen, B. R. Tillman, J. E. Wannamaker, and J. E. Bradley who with those chosen by the General Assembly would constitute a governing board if the State accepted the bequest, but, who, in the event the State declined the bequest, would alone constitute a governing board for a private institution.

These seven trustees, along with other friends of the movement and the agricultural groups in the State, developed and organized a public opinion favorable to the plan.

In November 1889, the South Carolina General Assembly accepted the terms of Mr. Clemson's will and following the decision of the U.S. Supreme Court to uphold the will, the State of South Carolina and the full Board of Trustees proceeded to convert the dream of Thomas G. Clemson into the reality of Clemson College.

The institution formally opened in July 1893, with an enrollment of 446 students. The first graduating exercises were held in December 1896, with a graduating class of 37—15 in the agricultural courses and 22 in engineering courses.

The college was also established under the Morrill Land-Grant Act passed by the National Congress in 1862. Clemson University, therefore, is a member of the national system of Land-Grant Colleges and Universities.

In 1964, in recognition of expanded offerings of the institution not only in the areas of agricultural and mechanical arts but also in the sciences and arts, the name of the institution was changed to Clemson University. This change by the legislature, effective July 1, 1964, followed a recommendation to that body by the Board of Trustees.

LOCATION

The University is located on the Fort Hill homestead of John C. Calhoun, in the foothills of the Blue Ridge Mountains. It has an elevation of 800 feet above sea level and commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5000 feet.

The University is located at Clemson, South Carolina, on the main line of the Southern Railway. U.S. Highways numbers 76 and 123 pass through Clemson.

BUILDINGS AND GROUNDS

Campus architecture is a pleasing blend of the old and new complemented by a beautiful landscape of abundant trees, grassy expanses, and flowering plants and shrubs.

The campus proper consists of 1,400 acres. The academic buildings, student housing, service facilities and equipment are valued at $168 million. Basically the campus is the site of Thomas Green Clemson's plantation, willed to South Carolina in 1888 for the establishment of the University. Fort Hill, former home of both Mr. Clemson and his father-in-law, John C. Calhoun, has been preserved at the center of the campus as a national shrine.

Challenges of the present—developing alternate energy sources and better conservation technology, improving agricultural production along with technology transfer, and improved health-care delivery—are symbolized by such buildings as the multipurpose center for the College of Nursing. Clemson's long, rich tradition of education, scientific research, and public service is brought to mind by historic structures like

Tillman Hall and its clock tower, focal point of the campus, whose cornerstone was laid in 1891

Beyond the main campus, stretching into Oconee, Pickens, and Anderson counties are another 24,000 acres of farm and agricultural and forestry research lands. Throughout the State are 8,300 more acres devoted to Agricultural Experiment Station research and 4-H Club activities.

One of the central features of campus development is the Robert Muldrow Cooper Library with its large reflection pool. This beautiful structure houses some 1,264,000 volumes, 224,000 equivalent volumes on microforms and other materials.

Facilities completed during the latter sixties and early seventies include three high-rise residence halls which house 1,296 students, a low-rise dormitory, a 24-bed hospital and out-patient clinic, and East Campus cafeteria, an arts and sciences classroom building and 10-story faculty office tower, and the multipurpose J. C. Littlejohn Coliseum which seats 11,000 people for basketball games and 12,000 for speaking engagements, concerts and other functions.

Teaching and laboratory facilities of the College of Agricultural Sciences are housed in the R. F. Poole Agricultural Center complex. Another grouping serves the College of Engineering, including Olin Hall for ceramic engineering and Earle Hall for chemical engineering. These two buildings and their excellent equipment represent gifts from the Olin Foundation totaling nearly $2 million.

Renovation of Sirrine Hall, home of the College of Commerce and Industry was completed in the fall of 1981.

The College of Architecture is located in the modern, well-equipped Lee Hall. Other groupings of classrooms and laboratories serve the College of Education, College of Liberal Arts, and College of Sciences.

Teaching, laboratory, and administrative facilities of the College of Education are located in historic Tillman Hall. Industrial Education programs are housed in Freeman and Godfrey Halls

Recent major additions to the campus include Jordan Hall for biological sciences and a multipurpose center for the College of Nursing. Hunter Laboratory for chemistry was completed in 1987.

A complex for the College of Forest and Recreation Resources and College of Agricultural Sciences administration was completed in 1975.

Other facilities include Jervey Athletic Center, and expansion of Lee Hall which houses the College of Architecture, Clemson University Union and related facilities, and additions and renovations at Fike Recreation Center, including a natatorium with a standard Amateur Athletic Union size swimming pool with tartan deck and a diving tank

University housing consisting of residence halls and apartment units will accommodate 7,000 single students. Apartments are available for 150 married couples

LIBRARIES

Current resources and facilities of Clemson's libraries make Clemson one of the most important research institutions in the Southeast. Today, the libraries have a collection of over one million items. Outstanding collections of journals, books, and primary research materials have been developed in many areas, especially agriculture, natural and physical sciences, economics and technology. In the social sciences, particularly strong manuscript collections have been developed around the papers of Vice President John C. Calhoun, South Carolina Governor James F. Byrnes, and Senator Edgar A. Brown. These and other resources are drawn on by scholars from all over the United States, Japan, and Europe. The library recently acquired the papers of South Carolina Senator Strom Thurmond; these soon will be made available for research.

Extensive use of the collection is made by borrowers from many parts of the Southeast through modern, efficient techniques. The libraries have a computerized catalog and circulation system called the LUIS. This makes the collections available for searching by terminals inside and outside the library and also provides accurate circulation control. The Cooper Library is linked by other computer terminals to more than 5,000 libraries through OCLC, Inc., for cataloging and inter-library loan services. Online bibliographic retrieval is available through the powerful data-base searching capabilities of BRS, Lockheed and SDC search services. A remote center with terminals accessing the Clemson mainframe computer is available in the library as well as a microcomputer laboratory.

In addition to the Robert M. Cooper Library, the University Libraries consist of the Emery A. Gunnin Architectural Library in Lee Hall, the Sirrine Library (textiles and business) in Sirrine Hall, and departmental libraries in Chemistry and Physics.

Except for adjustments in scheduling during holiday periods, Cooper Library is open Monday—Thursday, 7:45 a.m.-1:00 a.m.; Friday, 7:45 a.m.-11:00 p.m.; Saturday, 8:00 a.m.-6:00 p.m.; and Sunday, 1:00 p.m.-1:00 a.m.

Library policy requires that all students must present valid I.D. cards to check out library materials. New students are encouraged to visit with staff at the reference desk at any time to receive assistance with learning about the Library and to ask questions about collections, services, and policies.

COMPUTING FACILITIES

The Clemson University Computer Center supports student coursework through a network consisting of IBM 3081-K which has 32 megabytes of main storage and runs under the operating system MVS/XA and six VAX computers (five run under VMS and one under UNIX). Remote sites containing a variety of computers, terminals, and peripheral equipment are maintained in Brackett, Daniel, Lee, Lowry, Martin, and Sirrine halls and the library. Some contain large laboratories of microcomputers. Dialup telephone numbers are available for use with portable terminals. Any terminal on Clemson network can access any computer in the network, and access to off-campus computers is provided via Telenet. National and international electronic mail facilities are also available.

The Center supports all major programming languages as well as a number of simulation and special-purpose languages. A large library of statistical and mathematical routines is available. A variety of special-purpose equipment such as plotters, microfiche readers, and camera systems is maintained for general use.

STUDENT SERVICES

HOUSING

Single Student Housing University housing consisting of residence halls and apartment units will accommodate 7,000 single students. Rooms in residence halls are double occupancy, and the two-bedroom apartments will each accommodate four students. All single-student housing is air conditioned and furnished in a manner that meets the needs of today's college student. Upon returning a University Housing Application/Waiting List Card which is included in their application from the Admissions Office, new students are provided complete housing information. Graduate students and former students should write to the Housing Office for these materials. Refunds will be made in accordance with the housing contract.

Married Student Housing Clemson provides 150 apartments for married students. One hundred of these formerly served as faculty and staff housing and are located on the campus. The other 50 are located approximately one mile from the campus. Graduate students are given priority of assignment to married student housing. Brochures and application forms may be obtained by writing to the Housing Office, Mell Hall, Clemson University, Clemson, South Carolina 29631.

FOOD SERVICE

The University provides three economical board plans that can be used in two student dining halls and the Clemson House dining room. The student dining halls feature an unlimited seconds policy, except on some entrees, and the Clemson House serves meals on a la carte basis. Students dining at the Clemson House may use the meal card as a cash equivalency or for a predesigned meal at no additional cost. Meals also may be purchased on a cash basis in the dining hall. The following are rates for 1986-87:

Seven-Day Board Plan (21 meals), Monday through Sunday—holidays excluded, $570 per semester.

Five-Day Board Plan (15 meals), Monday through Friday—holidays excluded, $495 per semester.

Lunch-Only Board Plan (5 meals) Monday through Friday—holidays excluded, $255 per semester.

The meal plan begins immediately after the student obtains a meal card at the beginning of a semester and ends after the evening meal on the day of graduation. The meal card is personal and may not be loaned, transferred, or sold to another person.

Students entering the University for the first time from high school or preparatory school and who live in University housing, excluding Calhoun Courts, Clemson House, and Thornhill Village Apartments, are required to subscribe to a meal plan for their first semester. All other students have the option of selecting a meal plan on a semester basis or paying cash for individual meals at prevailing prices.

After paying for a meal plan either in the advance payment process or on registration day, no meal-plan changes that would cause a refund may be made during the first two weeks from the first day of registration. Following that period, meal-plan changes will be made only in the case of marriage, medical reasons, change in dormitory assignment to a dormitory room having kitchen facilities, conflict with working hours or class schedule, or other circumstances determined by the University to be beyond the student's control. Written documentation must be provided in all cases. Refunds will be prorated on a weekly basis.

HEALTH SERVICE

Student Health Service: Cost per Semester $70. Payment of the Student Health Service fee is required of all students living in University housing and all full-time students even though they do not reside in University housing.

The Student Health Service is housed in the Redfern Health Center and is complete with outpatient department and a 24-bed hospital. A full-time staff consists of a director, five physicians, two clinical psychologists, fifteen registered nurses, one registered X-ray technician, two registered laboratory technicians, and a registered pharmacist. In addition, a sufficient number of nurses' aides, secretarial workers, orderlies, and maids for 24-hour-a-day operation are employed. The best of modern equipment is available for student use. Regular office hours are maintained, plus the services of the nursing staff for minor ailments after hours. One physician is on call at night for emergencies whenever the school is open. The Health Service is closed between semesters.

The Student Health Service at Clemson University has several important functions. All of these are aimed at keeping the student in good health so that he may effectively pursue his school work. There is, of course, the basic function of medical care for the ill and injured. This is a vital part of its work. In addition to this, the Student Health Service attempts to put strong emphasis on health rather than illness. This begins with the entrance medical form. In laying out this form an attempt is made to get information, examinations, and preventive medical procedures carried out to better equip the staff in protecting the student from illness and to serve as a guide for the care of preexisting medical problems.

As the student progresses through his academic experiences, other procedures may be required or highly recommended. These are primarily an effort to teach the individual self-responsibility for maintenance of his own health, protection of the health of those around him, and location of possible hidden diseases. The Health Service also has the position as the source of medical information as well as responsibility for indicated medical action: diagnostic, therapeutic, and preventive.

The medical fee paid by each student covers the services of the University physicians, the Health Service staff, and equipment for most illnesses and injuries occurring on or around the campus. This coverage is given under conditions similar to that of one's own physician.

The fee does not cover routine physical examinations for employment or transfer to another school, fees for outside physicians when called in for consultation, medical or surgical services performed away from the University, or for accidents occurring off the campus.

A complete pharmacy is maintained and dispenses medication to students as prescribed by the staff physicians on a cost-plus service basis. Students are encouraged to pay for medications when received. When this is not possible, the Health Service will bill the student. A $5 service charge is added when billing is necessary.

Clemson University maintains a licensed emergency medical service which includes a modern modular ambulance and sufficient certified emergency medical technicians for 24-hour-a-day service. All medical emergencies on campus will be handled by the unit. In addition, transportation for serious illnesses or emergencies requiring special care will be provided by the unit at no cost. Expenses for nonemergency transportation, however, are to be paid for by the student.

HANDICAPPED STUDENTS

Clemson University recognizes a handicapped student as anyone who has an impairment which substantially limits one or more of his or her major life activities.

In compliance with Section 504 of the Rehabilitation Act of 1973, Clemson University has appointed an adviser to the handicapped as well as a University Committee on the Handicapped. One of the primary responsibilities of the adviser and the Committee is to help integrate the handicapped student into the normal academic process.

Prospective students are invited to visit Clemson to determine how their needs might be met by the campus facilities and services. Additional information is available from the Adviser for the Handicapped, Office of Student Life, 101 Mell Hall, *telephone (803) 656-2153.*

MEDICAL QUESTIONNAIRE

Completion of a medical history questionnaire is required of all new students entering Clemson University for the first time. This is to be completed by the student and mailed directly to Redfern Health Center, Clemson University, Clemson, South Carolina 29631. Some help may be needed from parents or family physician concerning necessary details about early childhood illnesses and immunizations.

Proof must be furnished of immunization for both red measles (Rubeola) and German measles (Rubella).

ACCIDENT AND SICKNESS INSURANCE

An accident and sickness insurance plan is available to all full- and part-time students and their dependents. Information concerning the insurance program is sent to students and parents with the fall semester prepayment material. Additional information may be obtained from the Office of Vice President for Student Affairs. This insurance is designed to cover major medical expenses not covered by the Health Service.

UNDERGRADUATE FINANCIAL AID

The Office of Student Financial Aid administers and/or coordinates various types of undergraduate financial aid administered by Clemson University: scholarships, loans, grants, and part-time employment. The office works jointly with the Financial Aid Committee and the Scholarships and Awards Committee.

Beginning in January of each year, students may apply to the Financial Aid Office for financial assistance for the next academic year. Financial aid requests, based on need, should be supported by a Financial Aid Form filed directly with the College Scholarship Services and renewed annually.

The cut-off date for scholarship application submission is February 15; work-study and loan applications should be submitted by April 1. Application for the Pell Grant and Guaranteed Student Loan should be made by April 1.

A brochure detailing the Financial Aid Program at Clemson can be obtained from the Financial Aid Office, G01 Sikes Hall, Clemson University or by calling (803) 656-2280.

COUNSELING SERVICES

The goal of the Counseling and Career Planning Center is to aid students in resolving personal issues, social concerns, and making career plans. In addition, students who would like to improve the way they cope with the many decisions and pressures college students must face are welcome.

Additional counseling services sponsored for students are groups and workshops on self-improvement such as weight-control, study skills, stress reduction, building self-confidence and others. A Self-help Library and an extensive Career Planning Resource Library are operated by the Center. A speaker service is maintained for groups, clubs, and classes who would like more information on self-improvement. In addition, the Center manages the National Testing Program on campus. Applications for tests such as the SAT, GRE, GMAT, LSAT, and others are available at the Center.

All sessions are confidential and free of charge to Clemson University students. Appointments may be made by calling 656-2451 or stopping by the office on South Palmetto Boulevard.

CAREER SERVICES

Career planning and development opportunities are available to students who desire information and assistance concerning their involvement with the world of work. These services are provided by the Office of Cooperative Education and the Office of Placement, located on the eighth level of the Clemson University Union.

Cooperative Education Program The Cooperative Education Program is a planned program in which students at the University combine alternate periods of academic study and periods of related work with a participating business, industry, agency, or organization. The work periods normally take place during the sophomore and junior years (including summers), while the freshman and senior years are spent in full-time study.

Students qualify for participation in the Cooperative Education Program by satisfactory completion of thirty semester hours of academic work. Transfer students may qualify in one semester. Three, four, or five co-op work periods are projected and included in each student referral. Usually two students from the same academic area are paired to fill a full-time work position with a participating employer. While one student is at work the other is enrolled in classroom study at the University.

Students enrolled in the Cooperative Education program pay a registration fee of $15 each semester or summer session which coincides with their work period. That fee enables students to maintain student status and participate in student activities and services that are normally associated with being enrolled at the University. However, the fee does not cover the cost of tuition for academic courses, health service, or any of the other benefits normally associated with the standard University fee. In responding to insurance, tax, loans, and other questionnaires about status, the University classifies a student on work assignment to be a full-time continuing student. Nevertheless, the University believes that some judgement decisions by outside agencies will be necessary in discerning whether or not certain benefits applicable to full-time students should be reasonably extended to students on work assignment. The University reserves the right to exercise such judgement.

The Cooperative Education Program is offered to students enrolled in academic departments or programs in the Colleges of Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, and Sciences.

Placement Service The University Placement Office provides assistance to students who seek permanent employment or summer work. The Office does not place candidates but assists them by providing counseling and seminars on career planning, job search, resume preparation, and interview techniques. Students are also encouraged to utilize the Placement Library consisting of reference books, video tapes, and literature provided by companies and agencies.

The Placement Office coordinates and plans campus interview visits with representatives from business, industry, and government agencies. These interviews are scheduled in the fall and spring semesters for qualified seniors or graduate students who are registered with the Placement Office. Employer information is on the computer mainframe to facilitate research.

Alumni seeking employment are encouraged to utilize the services of the Placement Office for counseling and guidance in their job search. Alumni are also eligible to receive the *Alumni Career Services Bulletin,* a weekly publication listing current job opportunities.

INTERNATIONAL PROGRAMS

Clemson University provides a number of opportunities for students to gain a global perspective, increase their knowledge of other countries and languages, and develop cross-cultural sensitivities.

International Student Exchange Program (ISEP) allows an undergraduate student to register and pay tuition, fees, and room and board at Clemson University and to enroll for a semester or a year at one of more than seventy universities worldwide. As an ISEP participant, one enrolls as a regular student at the host institution, takes the same courses, and participates in the same activities as regularly enrolled students at the foreign institution. Transfer credit is available upon approval. Application deadlines are normally in February.

Clemson University colleges that participate in studies abroad include Commerce and Industry, Engineering, and Liberal Arts. The College of Architecture offers a program in Italy for Architecture majors.

There are a variety of excellent opportunities for study abroad under the sponsorship of other United States colleges and international organizations.

For more information about the programs above, contact either the Vice Provost for Undergraduate Studies, 209 Sikes Hall or the International Services Office, 106 Sikes Hall. Information regarding grants for Clemson students who wish to study abroad may be obtained from the Financial Aid Office.

Scholastic Regulations

Proper discharge of all duties is required at Clemson University, and a student's first duty is his scholastic work. All students should be thoroughly acquainted with and cognizant of these basic requirements.

Credit System The semester hour is the basis of all credits. Generally, one recitation hour or three laboratory or shop hours a week for a semester constitute a semester hour. Thus, in ENGL 101, Composition I, 3(3,0), as you will find this subject listed in the Degrees and Curricula, the student takes three semester hours. When he completes this course satisfactorily, he is granted three semester credit hours on his record. The notation "3(3,0)" means that the course carries three credits, has three clock hours of theory or recitation per week, and no laboratory hours. CH 101, General Chemistry, 4(3,3), carries four semester hours, has three hours of theory, and a three-hour laboratory period.

Grading System The grading system is as follows:

A—*Excellent* Indicates that the student is doing work of a very high character, the highest grade given.

B—*Good* Indicates work that is definitely above average, though not of the highest quality.

C—*Fair* Indicates work of average or medium character

D—*Pass* Indicates work below average and unsatisfactory, the lowest passing grade.

F—*Failed* Indicates that a student knows so little of the subject that it must be repeated in order that credit may be received

I—*Incomplete* Indicates that a relatively small part of the semester's work remains undone. Grade I is not given a student who made a grade F on his daily work. Students are allowed thirty days after the beginning of the next scheduled session, excluding summers and regardless of the student's enrollment status, to remove the incomplete grade. Normally, only one extension for each I may be granted, and this under unusual circumstances. The extension must be approved in writing by the instructor of the course and the head of the department in which the course was taken. The extension will indicate the nature and amount of work to be completed and the time limit. (Students under this policy are prohibited from removing the I by repeating the course.) A letter grade of I coverts to F unless the incomplete is removed within the time specified.

W—*Withdrew* This grade indicates that the student withdrew from the course or was withdrawn by the instructor after the first four weeks of classwork and prior to the last five weeks of classes, not including the examination period. Each undergraduate student is allowed to withdraw or be withdrawn with a grade of W from no more than 14 hours of coursework during the entire academic career at Clemson University. Transfer students may withdraw from no more than 10 percent of the total work remaining to be done in the chosen undergraduate curriculum at the time of transfer to Clemson University up to a total of 14 hours of coursework, whichever is fewer. Partial credit for courses cannot be dropped. A student who exceeds these limits of hours or who is enrolled during any part of the last five weeks of classes shall have final grades recorded. These restrictions apply to withdrawal from the University as well. Any variance from these restrictions must be approved by the Provost or the Provost's designee.

Pass-Fail Option Juniors or Seniors enrolled in a four-year curriculum may take four courses (maximum of 15 credit hours), with not more than two courses in a given semester on a pass-fail basis. Transfer and five-year program students may take pass-fail courses on a pro rata basis.

Required courses or courses that are needed to fulfill departmental requirements may not be taken pass-fail.*

Letter-graded courses which have been failed may not be repeated pass-fail.

Honors Program may exercise an option as to acceptance of pass-fail grading for Honors courses.

Registration in pass-fail courses will be handled in the same manner as for regular enrollment. Departmental approval must be obtained via approval form and returned to the Office of Admissions and Registration in accordance with the University Calendar for adding courses.

Instructors will submit letter grades to the Office of Admissions and Registration. These grades will then be converted as follows: A, B, C to P (pass); D, F to F (fail). Only P (minimum letter grade of C) or F will be shown on a student's permanent record and will not affect the grade-point ratio.

If a student changes to a major which requires a previously passed course, and this course has been taken pass-fail, he may request either to take the course on a letter-graded basis, the P be changed to C, or substitution of another course.

In the event limited enrollment in a class is necessary, priority will be given as follows: majors, letter-graded students, pass-fail students, and auditors.

Final Examinations The standing of a student in his work at the end of a semester is based upon daily classwork, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of A on the work of the course prior to the final examination, but for all other students written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical courses in which final examinations are not deemed necessary by the department faculty.

Final examinations must be given on the dates and at the times designated in the final examination schedule.

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*Exception — CPSC 491, PRTM 206, 207, and 405 are offered on a Pass-Fail basis only.

Grade Reports Scholastic reports are mailed to students four times each year, including a preliminary statement of progress on undergraduate courses only near the middle of each semester and a final report on all courses at the end of each semester.

Dropping Classwork A subject dropped after the first four weeks of classwork and prior to the last five weeks is recorded as W—Withdrew.

Removal of Failures A student who has failed (made a grade F) in a subject cannot receive credit for that subject until it has been satisfactorily repeated hour for hour in class, except that in the case of correlated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given, that part of the subject shall be repeated in which the failure occurs.

Rescheduling Courses Failed A student who wishes to reschedule a course he has failed must do so within his next year of residence, or if the course is not offered during this year of residence, he must reschedule the course the first time it is offered thereafter during his attendance at Clemson.

Rescheduling Courses Passed A student may repeat a course he has passed with a grade lower than B provided he does so within three semesters of residence after the completion of his original enrollment in the course.

Advanced Placement and Credit by Examination In addition to earning credit by the usual method involving classroom attendance, a student may receive credit toward his degree by completing a course successfully by examination only.

Freshmen interested in exempting some of the elementary courses in this manner should participate in the College Board Advanced Placement Examination program and have the results of these tests sent to Clemson.

Certain departments will also grant credit for successful completion of College-Level-Examination Program (CLEP) subject examinations which are administered by the College Board.

Credit may be earned by enrolled students by means of a special examination without the necessity of class attendance subject to the following requirements:

1. The applicant must present evidence which would indicate that he has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested and that an examination is warranted.

2. The applicant must not have previously failed or audited the course at Clemson.

3. The applicant must apply in writing for the examination and the request must be approved by the instructor, head of the department in which the course is taught, dean of the college in which the course is taught, and the Dean of Admissions and Registration. Application forms are available in the Office of Admissions and Registration.

4. Credit (CR) will be awarded for acceptable work in lieu of letter grades in recognition of college-level achievement as determined by College Board Advanced Placement Examination, College-Level-Examination Program subject examination, institutional special examinations, and similar instruments.

Work Taken at Another Institution Clemson students may receive credit for work taken at another institution; however approval of the work should be obtained by the student prior to scheduling the work. Information and forms relative to this approval may be obtained in the Office of Admissions and Registration. By obtaining advance approval, the student is assured of receiving proper credit at Clemson provided he passes the work with a grade of C or higher.

No course taken at a nonbaccalaureate-degree institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Classification All new students are classified as freshmen unless they have attended another college prior to entrance. Students who have completed college work elsewhere will be classified on the basis of semester hours accepted at Clemson rather than the amount of work presented. In order to be classified as a member of any class other than freshman, students must meet the credit-hour requirements indicated below:

Sophomore—30 credit hours
Junior—60 credit hours
Senior—95 credit hours

Credit Load Except for an entering freshman who is restricted to the curriculum requirements of his major course, the credit load for an undergraduate must be approved by his class adviser. The class adviser will approve a credit load deemed in the best interest of the student based on such factors as course requirements, grade-point ratio, participation in other activities, and expected date of graduation.

The maximum number of hours in which a student may enroll is 21, and 15 is the maximum credit hours for those on probation. Written permission of the department head in which the student is a major is required for all registration involving more than 21 hours, or 15 maximum credit hours for those on probation.

ROTC Credit Ten hours of aerospace studies or military science may be counted toward the baccalaureate degree in any curriculum.

Grade-Point Ratio In calculating a student's grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours taken at Clemson during the semester, session, or other period for which the grade-point ratio is calculated. For each credit hour the student receives grade points as follows: A—4, B—3, C—2, D—1. No grade points are assigned for grades of F, I, or W.

Continuing Enrollment Policy At the end of any enrollment period, a notice of academic probation shall be placed on the grade report of an undergraduate student if his/her cumulative grade-point ratio is below 2.0, which is the minimum necessary for graduation.

In the event that a student is placed on academic probation, notification to that effect will be placed on the grade report for that session in which the student's academic deficiency occurred and for each session the student remains on probation The student who clears probation by returning to the graduating academic requirement (2.0) will have notice to that effect placed on the grade report for that session No notation concerning probation is placed on the student's permanent record.

A student on academic probation will be subject to suspension or dismissal at the end of a subsequent spring semester and/or summer session if his/her cumulative grade-point ratio is below the minimum standards for continuing enrollment. In exceptional cases, the dean of the college in which the student is enrolled may recommend to the Provost that a student with a grade-point ratio below these standards be suspended or dismissed at the end of any session of enrollment

The "credit level" used in connection with the minimum cumulative grade-point ratio requirement is based on all credits taken at Clemson, plus any advanced standing received from transfer credits and credits based on approved examination programs.

Credit Level	*Required Minimum Cumulative Average*
11-20	1.4
21-50	1.6
51-80	1.9
81 or more	2.0

However, a student on probation who averages at least 2.3 grade-point ratio since most recently entering probationary status and passes a minimum of 12 credits each fall and spring semester of enrollment during that period will be permitted to continue enrollment on probation even though his/her cumulative grade-point ratio is below the standard given above.

Initial failure to qualify for continued enrollment will result in suspension from the University for the next regular academic semester Notice of academic suspension will appear on the permanent record.

Suspended students will be permitted to enroll in summer school and may have their regular enrollment reinstated immediately if the summer school work brings their cumulative grade-point ratio above the minimum standard. In extraordinary cases, suspended students may appeal their suspension after completion of summer school This appeal may be made to the Appeals Committee on Continuing Enrollment. Only one such appeal may be made before suspension begins. Appeals will be granted only in the most exceptional cases.

Upon readmission after suspension, necessarily still on probation, a subsequent failure to meet the requirements for continued enrollment before clearing probation will result in dismissal from the University, and notice of dismissal for reasons of academic ineligibility will be entered on the permanent record A student who has been dismissed may petition the Appeals Committee on Continuing Enrollment for readmission after at least one regular semester. A denied appeal does not preclude subsequent appeals after an intervening regular semester.

Academic Renewal The student who has not enrolled for a period of two or more academic years after dismissal may apply to the Appeals Committee on Continuing Enrollment for readmission under special conditions known as academic renewal. Under these conditions, the previous credits attempted and quality-point deficit will not constitute a liability in a new grade-point computation. However, no credits passed or their attending quality points will be available to the student for a degree at Clemson. The previous record will appear on the permanent record as well as the notation of readmission under the policy of academic renewal. This policy applies to students who initially enroll at Clemson after May 15, 1982.

Withdrawal from the University A student may withdraw from the University subject to the restrictions in the section on W — Withdraw. Students who exceed these restrictions shall have final grades recorded. Any variance from the restrictions must be approved by the Provost or his designee.

Class Attendance Regular and punctual attendance at all class and laboratory sessions is the responsibility of each student. College work proceeds at such a pace that regular attendance is necessary in order for each student to obtain maximum benefits from instruction. All absences are matters to be resolved between the instructor and the student. In the event that a student finds it necessary to be absent from class, it is the student's responsibility to make up resulting deficiencies.

In an early class the instructor shall inform the students of the attendance policy for that class. (Departments may establish uniform attendance policies for multiple section courses.) A student who incurs excessive absences may be dropped from a course by the instructor.

Students desiring to withdraw from a class must secure a drop card from the Registrar's Office prior to terminating attendance. A student enrolled in the last five weeks of classes shall have final grades recorded.

Course Prerequisites Prerequisites for individual courses are enumerated under the course listings in the Description of Courses. In addition to these requirements, colleges and departments may also establish other standards as conditions for enrollment. In the College of Engineering a grade-point ratio of 1.8 or higher is required for registration in all engineering and engineering technology courses numbered 300 or higher. For undergraduate students who enter Clemson after May 15, 1983, the College of Engineering will require a cumulative grade-point ratio of 2.0 or higher for registration in all engineering and engineering technology courses numbered 300 or higher. In the College of Nursing, a grade-point ratio of 2.0 or higher is required for registration in all nursing courses numbered 300 or higher. The College of Education requires a cumulative grade-point ratio of 1.8 or higher to enroll in 300-level courses and a cumulative grade-point ratio of 2.0 for 400-level education courses. Directed teaching and teaching methods courses require a minimum cumulative grade-point ratio of 2.0. For undergraduate students who enter Clemson after May 15, 1986, a cumulative grade-point ratio of 2.0 or higher is required for registration in all teacher education courses numbered 300 or higher.

Auditing Policies Qualified students may audit courses upon the written approval of the instructor Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory exercises by auditors is at the discretion of the instructor A student who has previously audited a course is ineligible for credit by examination.

Undergraduate and graduate students enrolled in 12 or more hours and graduate assistants enrolled in 6 or more hours may audit courses at no additional charge. Others interested in auditing courses should verify their eligibility through the Registrar's Office

Academic Advising Each student is assigned to an academic adviser in his/her major area It is the responsibility of the student to consult with the adviser during preregistration and to obtain the adviser's signature for adding and dropping courses. The adviser will assist the student in scheduling courses so as to fulfill the requirements of the degree program. Nevertheless, it is the responsibility of the student to fulfill the relevant requirements of the degree. Advisers also maintain files on individual advisees to assist in academic planning.

Academic Records The student's permanent academic record is maintained in the Registrar's Office and contains personal identifying information, grades, and credits. Where appropriate, statements of a corrective nature, withdrawals, suspension for failure to meet academic standards, suspension for disciplinary reasons, and graduation data are added. It is a historical record of the student's academic progress.

ACADEMIC HONORS

Honor Graduates To be graduated with honors a student must have a minimum cumulative grade-point ratio as follows: cum laude—3.4, magna cum laude—3.7, and summa cum laude—3.9

Honor Lists At the end of the fall and spring semesters, the following lists shall be compiled of undergraduate students who have achieved grade-point ratios of 3.5 to 4.0 on a minimum of 12 semester hours, exclusive of pass-fail coursework

Dean's List — 3.5 to 3.99 grade-point ratio
President's List — 4.0 grade-point ratio

Honors Program The Honors Program of Clemson University is known as Calhoun College, and students enrolled in honors work are called Calhoun Scholars To enter or to remain in Calhoun College a student must have a cumulative grade-point ratio of 3.4 Admission to Calhoun College for incoming freshmen is by invitation, based primarily on SAT scores and high school academic records

Calhoun College is under the direction of the chairperson of the Honors Program Committee, a group comprising faculty members from each college The *Honors Program Student Handbook* is available in the chairperson's office, 532 Clemson House

Students graduating with Senior Departmental Honors will receive the Senior Departmental Honors medallion at an honors banquet The medallion is worn during graduation. Students' diplomas will reflect the honors designation

Honors and Awards The University offers a number of awards for outstanding achievement in specific fields and endeavors. Recipients are chosen by selection committees and are announced at the annual Honors and Awards Day program or other appropriate ceremonies. Detailed information relating to such awards is available in the offices of the academic deans and department heads.

GRADUATION REQUIREMENTS

A candidate for an undergraduate degree is a student who has turned in a completed diploma application by the deadline prescribed in the University Calendar for a particular graduation date.

Residence Requirement In order to qualify for an undergraduate degree, a student must spend at least the last year of residence at Clemson and complete at Clemson a minimum of 30 of the last 36 credits presented for the degree.

Make-up of I's Received in Last Semester A candidate for a degree who in the semester immediately prior to graduation receives one or more grades of I shall have an opportunity of removing the unsatisfactory grades provided the final grades are received in the Office of Admissions and Registration by the time grades for candidates for graduation are due.

A candidate who qualifies for graduation under this regulation will be awarded his degree on the regular date for the award of degrees.

Special Requirements A cumulative grade-point ratio of 2.0 is required for graduation. Candidates for degrees are required to apply for their diplomas within three weeks following the opening of the final semester or the opening of the summer session prior to the date the degrees are to be awarded. These applications should be filled out in the Office of Admissions and Registration on the regular blanks provided.

All work for a degree must be completed, all financial settlements made, and all government property and library books returned by 5 p.m. on the Tuesday preceding graduation.

Credit Limitation If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses.

Degrees and Curricula

Undergraduate curricula are offered under the colleges of Agricultural Sciences, Architecture, Commerce and Industry, Education, Engineering, Forest and Recreation Resources, Liberal Arts, Nursing, and Sciences.

The University grants the following degrees upon satisfactory completion of the requirements prescribed by the colleges listed.

College of Agricultural Sciences

Agricultural Economics and Rural Sociology	BS
Agricultural Industries	
Community and Rural Development	
Agricultural Education	BS
Agricultural Engineering[1]	BS
Agricultural Mechanization and Business	BS
Agronomy	BS
Animal Industries	BS
Animal Science	
Dairy Science	
Poultry Science	
Economic Biology	BS
Entomology	
Plant Pathology	
Wildlife and Fisheries Biology	
Food Science	BS
Horticulture	BS
Fruit and Vegetable	
Ornamental	
Turfgrass	
Packaging Science	BS

College of Architecture

Building Science and Management	BS
Design	BA, BS
Architecture	
City and Regional Planning	
Landscape Architecture	
Visual Arts	

College of Commerce and Industry

Accounting	BS
Economics	BA, BS
Financial Management	BS
Industrial Management	BS
Management	BS
Marketing	BS
Textile Chemistry	BS
Textile Management	BS
Textile Science	BS

College of Education

Early Childhood Education	BA
Elementary Education	BA
Graphic Communications	BS
Industrial Education	BS
Science Teaching	BS
Biological Sciences	
Chemistry	
Earth Science	
Mathematical Sciences	
Physical Sciences	
Secondary Education	BA
English	
History	
Mathematical Sciences	
Modern Languages	
Natural Sciences	
Political Science	
Social Sciences	

College of Engineering

Agricultural Engineering[1]	BS
Ceramic Engineering	BS
Chemical Engineering	BS
Civil Engineering	BS
Computer Engineering	BS
Electrical Engineering	BS
Engineering Analysis	BS
Engineering Technology	BS
Industrial Engineering	BS
Mechanical Engineering	BS

College of Forest and Recreation Resources

Forest Management	BS
Parks, Recreation, and Tourism Management	BS
Wood Utilization	BS

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[1] Jointly administered by the College of Agricultural Sciences and the College of Engineering

College of Liberal Arts	
English	BA
History	BA
Modern Languages	BA
Philosophy	BA
Political Science	BA
Psychology	BA
Sociology	BA

College of Nursing	
Nursing	BS

College of Sciences	
Biochemistry	BS
Biological Sciences	BA, BS
Chemistry	BA, BS
Computer Information Systems	BS
Computer Science	BS
Geology	BA, BS
Mathematical Sciences	BA, BS
Medical Technology	BS
Microbiology	BS
Physics	BA, BS
Prepharmacy	Nondegree
Prephysical Therapy	Nondegree

BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN PREPROFESSIONAL STUDIES

Clemson University will award the degree of Bachelor of Arts or Bachelor of Science in Preprofessional Studies to a student who has satisfactorily completed three years of undergraduate work in an appropriate curriculum and the first year of work in an accredited medical, dental, veterinary, law, or other accredited, professional, postgraduate school, provided the student fulfills the requirements for the three-year program as follows and the other specified conditions are met.

1. At least two of the three years of preprofessional work, including the third year, must be taken in residence at this University.

2. A minimum of three years of undergraduate work (i.e., preprofessional school credit) must be presented.

3. Normal progress must have been made toward fulfilling the degree requirements of the curriculum in which the student is enrolled at Clemson.

4. The student applying for the Bachelor of Arts or Bachelor of Science in Preprofessional Studies must be recommended by the college at Clemson in which the curriculum that he/she is majoring as a Clemson student is located or by the college in which three years of normal progress toward a degree can be identified.

5. If the combination of preprofessional work taken and the work in the first year of professional school is equivalent to that which is required in some other bachelor's degree program at Clemson, the college concerned may recommend the other bachelor's degree.

The above requirements and conditions became effective July 1, 1974, and will apply to all students who satisfy these requirements and conditions after that date.

A Clemson student having left the University before receiving the bachelor's degree (prior to July 1, 1974), and having enrolled immediately in an accredited, professional, postgraduate school may apply for a bachelor's degree from Clemson and have his/her application considered on an individual basis. The college(s) at Clemson considering the application are authorized to examine the student's entire record in both preprofessional and professional studies and exercise their own judgment concerning the three-year requirement for preprofessional studies.

SECOND BACCALAUREATE DEGREE

To complete a second baccalaureate degree, a student must complete a minimum of 30 semester hours at Clemson in addition to the greater number of hours required for either degree and satisfy all course and grade requirements for the second degree.

DOUBLE MAJOR

A student in a bachelor of arts degree program may be awarded a single baccalaureate degree with a double major. The two majors may be within a single college or may involve two colleges, but are limited to bachelor of arts degree programs. A request for a double major must be initiated by the student and routed through the student's adviser and the department head to the college dean. Where appropriate, the dean arranges concurrence of the cooperating college's dean, department head, and adviser.

GRADUATE DEGREES

The degrees of Doctor of Philosophy; Doctor of Education; Education Specialist; Master of Arts; Master of Science; Master of Agricultural Education; Master of Agriculture; Master of Architecture; Master of Business Administration; Master of Building Science and Management; Master of City and Regional Planning; Master of Education; Master of Engineering; Master of Fine Arts; Master of Forestry; Master of Industrial Education; Master of Nutritional Sciences; Master of Professional Accountancy; and Master of Parks, Recreation, and Tourism Management are awarded to those students who satisfactorily complete prescribed graduate programs.

For further information concerning advanced degrees see *The Graduate School Announcements,* which may be obtained from the Office of the Dean of Graduate School

COURSE NUMBERS

In the curricula which follow are given the official titles and number of the courses, the descriptive titles and the number of semester hours credit.

GENERAL EDUCATION REQUIREMENTS

An undergraduate student whose enrollment in a curriculum occurs after May 15, 1984 must fulfill the general education requirements in the catalog in effect at the time. A student who withdraws from the University and subsequently returns after May 15, 1984 will be required to satisfy the general education requirements. Any variation in curricular or general education requirements shall be considered under the substitution procedure.

The general education requirements in some curricula are more restrictive than the general requirements shown below.

A. Composition and Speaking Skills 9 hours
   1. English 101, 102
   2. Three hours from English 231, 301, 304, 312, 314, 316, 345, 346, 347

B. Mathematics 6 hours
   1. Six hours taken from any course in mathematical sciences and EXST 301

C. Science and Technology 11 hours
   1. A two-semester sequence in the same physical or biological science, each including a laboratory
   2. At least an additional 3 hours in an applied science to be selected from the following:
      Any introductory physical or biological science, except the science selected to fulfill C 1 above
      Agricultural Engineering — All courses except 471, 472, 473
      Agricultural Mechanization — All courses except 408, 472
      Agriculture — All courses except 301, 401, H491, H492
      Agronomy — All courses except 350, 406, 455, 456
      Animal Physiology 301, 460
      Animal Science — All courses except 205, 360, 406, 422
      Architecture 425, 488
      Astronomy 301, 302, 401, 402, 403, 410
      Biochemistry 431
      Biological Science 201, 202, 280
      Botany 145, 203, 221
      Building Science 201, 202, 203, 301, 302, 304, 403, 471, 472, 475, 476
      Computer Science 101, 110, 120, 130
      Dairy Science — All courses except 401, 409, 490
      Economics 311, 430
      Education 458, 497
      Engineering — All Engineering-designated courses or combinaation of courses that are 3 hours or more
      Entomology — All courses except 461, 462, 468, 490
      Environmental Science 432, 471, 472
      Experimental Statistics 301, 462
      Food Science — All courses except 417, 418, 420, 421, 491
      Forestry 205, 206, 221, 222, 251, 252, 253, 254, 255, 302, 305, 306, 307, 308, 310, 312, 325, 403, 405, 409, 411, 412, 413, 415, 420, 424, 429, 430, 431, 432, 434, 436
      Genetics — All courses
      Geology 400, 402, 403, 405, 406, 407, 408, 413
      Graphic Communications 104

Horticulture — All courses except 304, 308, 407, 409, 410, 416, 461, 462, 470, 471
Industrial Education 102, 105, 203, 205, 208, 316, 320, 415, 418
Management Science 310, 413, 414
Mathematical Sciences 231
Microbiology 100
Nursing 298, 300
Nutrition — All courses
Physics 240, 245, 262, 340, 341, 473
Plant Pathology — All courses
Poultry Science — All courses except 405, 406, 460, 471
Safety and Health 300, 301, 305, 306
Textile Chemistry 315, 316, 405, 406
Textile Management and Textile Technology 175, 176, 201, 202, 308, 313, 314, 321, 322, 414, 426, 440, 460
Wildlife and Fisheries Biology — All courses except 490, 499
Zoology 456

D. Humanities 6 hours

1. Three hours selected from sophomore literature courses (200 level only) or foreign language literature (300 level or higher)
2. Three hours selected from the following (excluding practica):

Art and Architectural History — All courses except 411, 412
English — All courses except 100, 101, 102, 111, 217, 231, 260, 279, 301, 304, 312, 314, 331, 333, 334, 335, 345, 346, 347, 362, 364, 368, 377, 392, 485, 490
French — All courses, 300 level or higher, except 305, 409
German — All courses, 300 level or higher, except 305, 411, 412
Humanities — All courses
Italian — All courses, 300 level or higher
Language and International Trade 400
Liberal Arts 110, H110
Music 151, 152, 210, 251, 252, 301, 306, 311, 315, 316, 362, 363, 365
Philosophy — All courses
Religion — All courses
Russian — All courses, 300 level or higher
Spanish — All courses, 300 level or higher, except 305, 306, 409
Visual Arts — All courses
Women's Studies 301

E. Social Sciences 6 hours

1. Six hours selected from the following:

Agricultural Economics — All courses
Anthropology — All courses
Economics — All courses except 311, 430
Geography — All courses
History — All courses
International Studies 201
Liberal Arts H111
Political Science — All courses
Psychology — All courses except 105
Rural Sociology 303, 359, 371, 401, 403, 471, 495, 498
Science and Technology in Society 300
Sociology — All courses

38 hours

COLLEGE OF AGRICULTURAL SCIENCES

Modern agriculture involves the science, business, and art of producing, processing, and distributing plant and animal products and includes economics and human relations associated with these activities. Agriculture is a unique educational area because of the economic and human welfare implications in the application of the basic sciences to biological problems and materials and the wise use and conservation of natural resources.

Thousands of agricultural graduates are needed annually to serve this basic industry. Our land-grant colleges and universities are graduating less than the number demanded to fill careers with a future, with a challenge, and careers that indeed serve humankind.

Today's agriculture includes much more than farm production. Agriculture is a complex profession. About 6 million people provide supplies and services for farmers, and 10 million process and distribute farm products. These two segments, together with farm production which employs 5 million workers, provide careers somewhere in agriculture for 21 million Americans—approximately one-third of all jobs.

The College of Agricultural Sciences offers nine Bachelor of Science majors, one of which is jointly administered with another college: Agricultural Engineering with the College of Engineering. Within these nine degree majors, a student may select one of 16 curricula as follows: Agricultural Economics and Rural Sociology with curricula in Agricultural Industries and Community and Rural Development; Agricultural Education; Agricultural Engineering; Agricultural Mechanization and Business; Agronomy; Animal Industries with curricula in Animal Science, Dairy Science, and Poultry Science; Economic Biology with curricula in Entomology, Plant Pathology, and Wildlife and Fisheries Biology; Food Science; and Horticulture with three curricula: Fruit and Vegetable, Ornamental, and Turfgrass.

MINOR CONCENTRATIONS

The curricula in agriculture are designed to provide a solid foundation of principles on which to solve problems and to do this in a practical setting of real-world situations. A minor is required in all curricula except Agricultural Engineering, Agricultural Mechanization and Business, Dairy Science, and all curricula in the Economic Biology major. Six formal minors have been established as follows:

Business This minor emphasizes principles and practices of business management as applied to businesses and industries associated with agriculture. It is designed for students who plan to work with one of the many businesses and industries that provide supplies and services for the farmer and process and distribute farm products.

Environmental Science This minor emphasizes an understanding of the environment, including cause-and-effect relationships. It is designed for students who wish to supplement their undergraduate majors with knowledge and skills uniquely applicable to the environment in relation to agriculture.

International Agriculture This minor emphasizes the international aspects of agriculture and applies basic scientific principles and agricultural practices to worldwide agriculture. It is designed for students who contemplate work in international agricultural positions either in the United States or abroad.

Production This minor emphasizes the application of scientific principles to agricultural production. It is designed for students whose anticipated work requires broad general training in scientific and practical agriculture.

Science This minor emphasizes the basic sciences that prepare students to contribute to the advancement of knowledge in their respective fields. It is designed for students whose anticipated work requires considerable scientific training, usually including graduate studies.

Second Department This minor emphasizes special training in an area of study other than the major. A Second Department minor may be selected either within or outside of the College of Agricultural Sciences. It is designed for students who wish additional specialized training outside their major area of study.

GRADUATE STUDY

The College of Agricultural Sciences also offers programs leading to the Master of Agriculture, Master of Agricultural Education, Master of Nutritional Sciences, Master of Science, and Doctor of Philosophy degrees.

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

The Agricultural Economics and Rural Sociology major includes curricula in Agricultural Industries and Community and Rural Development.

AGRICULTURAL INDUSTRIES

The curriculum in Agricultural Industries places emphasis on a strong background in economics with applications to agricultural and agriculturally-related businesses. Also included are courses in basic agricultural and biological sciences, liberal arts, and business. Students have eighteen hours of free electives that may be used for further specialization or to broaden the educational experience.

Students have the opportunity to concentrate in one of several areas of specialty as follows: Agri-Industries Management, Agri-Marketing, Agricultural Administration, Agricultural Finance, Agricultural Sales and Merchandising, Economics, Farm Management, and Real Estate.

Employment opportunities open to graduates with an Agricultural Industries curriculum are many. These include sales and promotional work for a variety of businesses, management positions in the farm-loan departments of private banks or with cooperative farm credit agencies, public relations activities for various firms, market managers and directors, county agents, representatives of government agencies serving agriculture, and operators of numerous enterprises.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro to Animal Ind	3	AGRIC 104 Intro to Plant Sciences	3
AGRIC 105 Agriculture and Society	2	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 102 Intro to Math Analysis	3
MTHSC 101 Finite Probability	3	PHIL 102 Intro. to Logic	3
Science Requirement[1]	4	Science Requirement[1]	4
	15		16

SOPHOMORE YEAR

First Semester		Second Semester	
ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
ECON 212 Principles of Economics	3	AGEC 202 Agricultural Economics	3
EXST 301 Introductory Statistics	3	AGEC 308 Quant Agric Economics	3
or MTHSC 203 Elem Stat Infer	3	CPSC 110 Elem Comp Prog	3
Communication Requirement[2]	3	or CPSC 120 Intro. to Infor Proc Sys.	3
Science Requirement[3]	3	Communication Requirement[2]	3
Elective	3	Literature Requirement[4]	3
	18		18

JUNIOR YEAR

First Semester		Second Semester	
AGEC 302 Economics of Farm Mgt	3	AGEC 309 Economics of Agric Mkt	3
ECON 314 Inter Economic Theory	3	Agriculture Requirement[5]	6
EXST 462 Statistics Applied to Econ.	3	Concentration	6
RS 301 Rural Sociology	3	Elective	3
Agriculture Requirement[5]	3		18
Elective	3		
	18		

SENIOR YEAR

First Semester		Second Semester	
AGEC 402 Production Economics	3	AGEC 406 Seminar	1
LAW 322 Legal Environ of Business	3	AGEC 456 Prices	3
Concentration	6	Concentration	6
Elective	3	Elective	6
	15		16

134 Total Semester Hours

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[1] A two-semester sequence from the College of Sciences in the same physical or biological science, each including a laboratory

[2] Select from ENGL 231, 301, 304, 314

[3] A physical or biological science from the College of Sciences.

[4] Selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[5] Courses in the College of Agricultural Sciences not including those in the Department of Agricultural Economics and Rural Sociology

COMMUNITY AND RURAL DEVELOPMENT

The Community and Rural Development curriculum is designed to provide students with training to deal with local, national, and international development issues. Students learn about agriculture, natural environments, and basic principles in several disciplines. Associations between natural resources and social, economic, and political institutions are studied. Students receive practical training, and internships are available to complement the coursework in this curriculum.

A bachelors degree with a major in Community and Rural Development will qualify students for employment with local, state, regional, and federal agencies; with utilities, cooperative-extension services, private businesses, research-consulting firms, and financial institutions. This major also provides an excellent background for professional or graduate study in several disciplines.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Industries	3	AGRIC 104 Intro. to Plant Sciences	3
AGRIC 105 Agriculture and Society	2	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 102 Intro. to Math. Analysis	3
HIST 102 History of the U.S.	3	POSC 201 Intro. to Political Science	3
MTHSC 101 Finite Probability	3	Science Requirement[1]	4
Science Requirement[1]	4		16
	18		

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3	ACCT 200 Basic Accounting	3
AGM 301 Soil and Water Conservation	3	AGEC 352 Public Finance	3
or AGRON 202 Soils	4	CPSC 110 Elementary Computer Prog.	3
or GEOL 400 Environmental Geology	3	or CPSC 120 Intro. to Inf. Proc. Sys.	3
ENGL 231 Intro. to Journalism	3	ECON 212 Principles of Economics	3
or ENGL 304 Business Writing	3	Literature Requirement[2]	3
or ENGL 314 Technical Writing	3	Social Science Requirement[4]	3
EXST 301 Introductory Statistics	3		18
RS 301 Rural Sociology	3		
Humanities Requirement[3]	3		
	18-19		

JUNIOR YEAR

ECON 314 Inter. Economic Theory	3	CRD 357 Natural Res. Economics	3
ENGL 301 Public Speaking	3	RS (SOC) 401 Human Ecology	3
RS (SOC) 359 The Community	3	Advanced Economics Requirement[6]	3
Minor[5]	3	Advanced Social Science Requirement[7]	3
Elective	4	Minor[5]	4
	16		16

SENIOR YEAR

CRD (AGEC) 411 Reg. Impact Analysis	2	AGEC 403 Land Economics	3
EXST 462 Statistics Applied to Economics	3	CRD (AGEC) 412 Spatial Competition and Rural Development	2
Advanced Social Science Requirement[7]	3	RS (SOC) 471 Demography	3
Minor[5]	2	Minor[5]	5
Planning Requirement[8]	3	Elective	3
Elective	3		
	16		16

134 Total Semester Hours

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[1] A two-semester sequence from the College of Sciences in the same physical or biological science, each including a laboratory.

[2] Select from ENGL 202, 208, 209.

[3] Select from drama, foreign language, humanities, music, philosophy.

[4] Select from GEOG 101, 102, 302, or SOC (RS) 303.

[5] See adviser for available minors and course requirements.

[6] Select from ECON 302, 407, 421, or MGT 405.

[7] Select from POSC 302, 321, 361, 423, 427, or SOC 380, 381, SOC (RS) 371, 403, 495.

[8] Select from CAPL 411, 472, 483.

AGRICULTURAL EDUCATION

The Agricultural Education major is designed for students who wish to prepare for positions in vocational agriculture, agricultural occupations, and other teaching positions in the secondary schools; engage in other forms of educational work such as agricultural missionary, public relations, and agricultural extension, farming, soil conservation, and other governmental work, business and industry.

This major provides for a broad education in general and professional education including student teaching. In addition to required courses giving a thorough background in the agricultural and biological sciences, a student will minor in a second department of the college. Students in other departments in the College of Agricultural Sciences may minor in Agricultural Education and be certified to teach if they meet all requirements.

FRESHMAN YEAR

First Semester		**Second Semester**	
AGRIC 103 Intro to Animal Ind	3	AGED 100 Orient and Field Exper	1
AGRIC 104 Intro to Plant Sci	3	BIOL 104 General Biology II	3
BIOL 103 General Biology I	3	BIOL 106 General Biology Lab II	1
BIOL 105 General Biology Lab I	1	CH 102 or 112 General Chemistry	4
CH 101 General Chemistry	4	ENGL 102 Composition II	3
ENGL 101 Composition I	3	Mathematics Requirement[1]	3
	17	Elective	1
			16

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3	AGM 205 Principles of Farm Shop	3
AGED 201 Intro to Agric Ed	3	or AGM 206 Agric Mech	3
CPSC 120 Intro to Infor Proc Sys	3	AGRON 202 Soils	4
or PHYS 200 Introductory Physics	4	FOR 305 Elem. of For	2
Humanities Requirement[2]	3	FOR 307 Elem. of For Lab	1
Mathematics Requirment[1]	3	HIST 191 World in the 20th Century	3
Elective	0-1	Literature Requirement[3]	3
	16		16

JUNIOR YEAR

AGEC 302 Econ of Farm Mgt	3	ANSC 301 Feeds and Feeding	3
AGM 301 Soil and Water Conserv	3	ED 302 Educational Psychology	3
or AGM 452 Farm Power	3	ENGL 231 Intro to Journalism	3
ENT 301 General Entomology	3	or ENGL 301 Public Speaking	3
Minor[4]	6	or ENGL 304 Business Writing	3
Elective	1	Minor[4]	6
	16	Elective	3
			18

SENIOR YEAR

AGED 423 Curriculum	2	AGED 400 Supv Field Exp. II	1
HORT 407 Landscape Design	3	AGED 401 Meth. in Agric. Ed	3
PLPA 301 Plant Pathology	3	AGED 406 Directed Teaching	12
Minor[4]	3	AGED 425 Teaching Agric. Mech.	2
Elective	6		18
	17		

134 Total Semester Hours

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[1] A minimum of 6 credits in mathematical sciences is required, excluding MTHSC 115, 116, 215, 216, 250 (may include EXST 301).

[2] See Humanities section under General Education Requirements, page 53

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] See adviser for available minor areas and course requirements

AGRICULTURAL ENGINEERING

The graduate in agricultural engineering, with broad training in mathematics, physics, chemistry, and the biological sciences as well as comprehensive coverage of the engineering sciences, is well equipped to apply engineering to many functions affecting the well-being of mankind. Agricultural engineers are sought by industry and public service organizations primarily for their ability to apply engineering knowhow to agricultural production and processing and to the management of land and water resources. Specific areas of interest include power and machinery, soil and water resources engineering, electric power and processing, structures and environment, and food engineering.

This major includes such engineering sciences as mechanics, fluids, thermodynamics, electrical theory, computing devices and systems analysis. The basic agricultural sciences of soils, plants, and animals are included to provide a foundation for agricultural engineering analysis and design. Also included are the important facets of energy conversion, engineering properties of biological materials, research methods, and use of economy and integrity in design.

Graduate programs lead to the Master of Science, Master of Engineering, and Doctor of Philosophy degrees.

Opportunities for employment of agricultural engineering graduates include design engineers, research engineers, production engineers, and sales engineers with industry; teachers, research, extension, and field engineers with state and federal agencies; and engineers in the private sector.

FRESHMAN YEAR

First Semester		**Second Semester**	
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry[3]	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
ENGR 100 Career Guidance Seminar[1]	0	ENGR 100 Career Guidance Seminar[1]	0
ENGR 180 Engineering Concepts	3	MTHSC 108 Cal. of One Var. II	4
or Humanistic-Social Elective[2]	3	PHYS 122 Phys. with Cal. I	3
MTHSC 106 Cal. of One Var. I	4	Humanistic-Social Elective[2]	3
Elective	3	or ENGR 180 Engr. Concepts	3
	17		17

SOPHOMORE YEAR

AGE 221 Soil and Water Resources Engineering I	3	AGE 212 Fund. of Mechanization	3
EG 109 Engineering Graphics	2	EM 202 Engr. Mech. Dynamics	3
EM 201 Engr. Mechanics Statics	3	MTHSC 208 Intro. to Ord. Diff. Equa.	4
MTHSC 206 Calculus of Sev. Var.	4	PHYS 222 Phys. with Cal. III	3
PHYS 221 Phys. with Cal. II	3	Elective	4
PHYS 223 Physics Lab. II	1		17
Literature Requirement[4]	3		
Elective	1		
	20		

JUNIOR YEAR

AGE 353 Computational Systems	2	AGE 355 Engineering Analysis and Creat.	2
AGE 362 Energy Conv. in Ag. Sys.	3	AGE 364 Ag. Waste-Mgt. Sys.	2
E&CE 307 Basic Elec. Engr.	2	AGE 465 Engr. Prop. of Biol Mat.	2
E&CE 309 Elec. Engr. Lab. I	1	AGRON 202 Soils	4
EM 304 Mechanics of Materials	3	EM 320 Fluid Mechanics	3
ME 310 Thermodynamics and Heat Transfer	3	Engineering Science Elective	3
Animal Science Elective[3]	3	Plant Science Elective[3]	3
Engineering Science Elective	3		19
	20		

SENIOR YEAR

AGE 416 Agric. Machinery Design	3	AGE 422 Soil and Water Resources Engineering II	3
AGE 431 Ag. Struct. and Environ. Design	4	AGE 442 Agric. Process Engr.	3
AGE 471 Research I	1	AGE 472 Research II	1
ECON 211 Principles of Economics	3	ENGL 301 Public Speaking	3
or ECON 200 Economic Concepts	3	or ENGL 314 Technical Writing	3
Humanistic-Social Elective[2]	3	Humanistic-Social Elective[2]	3
Elective	2	Mathematics Elective[3]	3
	16		16

142 Total Semester Hours

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[1] One-half of the entering freshman class will enroll during the first semester; the other one-half will enroll during the second semester. This is a required course.

[2] See Policy on Humanities and Social Sciences for Engineering curricula, page 119.

[3] See adviser.

[4] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

AGRICULTURAL MECHANIZATION AND BUSINESS

The major in Agricultural Mechanization and Business is designed to provide an educational program for undergraduate students who desire training in areas which are relevant to a dynamic agricultural enterprise. It is organized with strength both in the business management area and in nonengineering type support of technical agriculture and agribusiness concepts. In order to produce an individual who is well rounded and capable of communicating, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

The graduate in agriculture with a major in Agricultural Mechanization and Business finds meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro. to Animal Ind.	3	AGRIC 104 Intro. to Plant Sci	3
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab. I	1	BIOL 106 General Biology Lab. II	1
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
Mathematics Requirement[1]	3	Mathematics Requirement[1]	3
	17		17

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3	ACCT 201 Principles of Accounting	3
AGM 205 Principles of Farm Shop	3	AGM 206 Agric. Mechanization	3
AGRIC 200 Agric. Appl. of Microcomp	3	PHYS 208 General Physics II	4
EG 109 Engineering Graphics	2	Economics Requirement[4]	3
PHYS 207 General Physics I	4	Social Science Requirement[3]	3
Literature Requirement[2]	3		16
	18		

JUNIOR YEAR

AGEC 302 Econ. of Farm Mgt	3	AGEC 309 Econ. of Agric. Marketing	3
AGEC 351 Agricultural Sales, Merchandising, and Advertising	3	AGM 402 Drainage, Irrigation, and Waste Management	3
or AGEC 352 Public Finance	3	AGM 406 Mech. and Hydraulic Systems	3
AGM 302 Rainfall, Runoff, and Erosion Control	3	AGRON 302 Soils	4
AGM 303 Cal. for Mech. Agric	3	ENGL 231 Intro. to Journalism	3
Social Science Requirement[3]	3	or ENGL 304 Business Writing	3
Elective	3	ENGL 301 Public Speaking	3
	18		19

SENIOR YEAR

AGEC 319 Agribusiness Mgt.	3	AGM 404 Farm Structure	3
or AGEC 409 Commodity Futures Market	3	AGM 408 Equip. Sales and Service	3
AGM 452 Farm Power	3	Agriculture Requirement[4]	3
AGM 460 Farm and Home Utilities	3	Elective	7
AGM 472 Seminar	1		16
Economics Requirement[4]	3		
Humanities Requirement[5]	3		
	16		

137 Total Semester Hours

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[1] A minimum of 6 credits to be selected from MTHSC 102, 105, 106.

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] Select from ED 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PHIL 101, 325, POSC 101, PSYCH 201, SOC 201, 401, or any agricultural economics and rural sociology courses.

[4] See class adviser.

[5] See General Education Requirement.

AGRONOMY

Agronomy is the science that deals with field crops and soils Crop science includes crop management, physiology, ecology, weed control, plant breeding, and genetics. Soil science involves genesis, utilization, soil physics, chemistry, microbiology, management, and fertility Agronomy involves the conversion of basic scientific and technological facts into useful systems and the solution of practical production problems

The graduate may find employment opportunities with federal, state, and private agencies Agronomists are employed with agrichemical, educational, seed, and other industries in technical, supervisory, and sales positions. Some return to the farm as either manager or owner-manager

Students majoring in Agronomy will declare a minor in a second department or an interdisciplinary area.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 103 Intro to Animal Ind	3	AGEC 202 Agricultural Economics	3
CH 101 General Chemistry	4	AGRIC 104 Intro to Plant Sciences	3
ENGL 101 Composition I	3	CH 112 General Chemistry	4
Mathematics Requirement[1]	3	ENGL 102 Composition II	3
Social Science Requirement[2]	3	Mathematics Requirement[1]	3
	16		16

SOPHOMORE YEAR

AGRON 202 Soils	4	BOT 205 Plant Form and Function	4
BIOL 103 General Biology I	3	PHYS 200 Introductory Physics	4
BIOL 105 General Biology Lab I	1	Humanities Requirement[6]	3
CH 223 Organic Chemistry	3	Minor[5]	4
and CH 227 Organic Chem Lab	1	Elective	3
or BIOCH 210 Elem Biochem	4		18
Literature Requirement[3]	3		
Elective	3		
	18		

JUNIOR YEAR

AGRON 421 Field Crops—Monocots and Specialty Crops	3	AGRON 422 Field Crops—Dicots	3
		AGRON 424 Adv Field Crops Lab	1
BOT 421 Plant Physiology	4	AGRON 452 Soil Fer and Management	3
GEN 302 Introductory Genetics	4	AGRON 453 Soil Fert Lab	1
PLPA 301 Plant Pathology	3	ENT 301 General Entomology	3
or MICRO 305 General Microbiology	4	Agronomy Requirement[7]	3
Communication Requirement[4]	3	Social Science Requirement[2]	3
	17 18		17

SENIOR YEAR

AGRON 455 Seminar	1	AGRON 456 Seminar	1
Agronomy Requirement[7]	8	Agronomy Requirement[7]	9
Minor[5]	6	Minor[5]	5
Elective	3	Elective	3
	18		18

138 139 Total Semester Hours

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[1] A minimum of 6 credits in mathematical sciences is required excluding MTHSC 101 115 116 215 216 May include EXST 301

[2] Select from the following GEOG 101 301 302 HIST 101 102 172 173 POSC 201 PSYCH 201 RS 359 401 471 SOC 201 all agricultural economics courses

[3] Select from the following ENGL 202 203 204 205 206 207 208 209

[4] Select from ENGL 231 301 304 314

[5] See adviser for available minors and course requirement 15 credits required in a minor

[6] At least 3 credits selected from art and architectural history drama humanities music philosophy religion or visual arts courses

[7] Select at least 6 courses from the following AGRON 403 405 407 423 425 446 475 490

ANIMAL INDUSTRIES

The Animal Industries major includes three curricula—Animal Science, Dairy Science, and Poultry Science

ANIMAL SCIENCE MAJOR

The curriculum in Animal Science exposes the student to a broad education in science and the humanities and a specialized knowledge of the principles involved in livestock production and processing. Scientific principles are discussed and the application of these principles to the livestock are stressed.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 104 Intro to Plant Sciences	3	ANSC 202 Intro Animal Science	3
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
Mathematics Requirement[1]	3	Mathematics Requirement[1]	3
	17		17

SOPHOMORE YEAR

BIOCH 210 Elem Biochemistry	4	AGRON 202 Soils	4
or CH 223 Organic Chemistry	3	ANPH 301 Physiology and Anatomy of Domestic Animals	4
and CH 227 Organic Chemistry Lab	1	ANSC 209 Animal Science Techniques I	1
DYSC 201 Intro to Dairy Science	3	GEN 302 Introductory Genetics	4
MICRO 305 General Microbiology	4	Humanities Requirement[4]	3
PS 201 Poultry Husbandry	3	Social Science Requirement[3]	3
Literature Requirement[2]	3		
	17		19

JUNIOR YEAR

ANSC 303 Livestock Evaluation I	2	ANSC 301 Feeds and Feeding	3
ANSC 308 Animal Science Techniques II	1	ANSC 306 Livestock Evaluation II	2
ANSC 353 Meats	2	ANSC 309 Animal Science Techniques III	1
ANSC 355 Meats Lab	1	ANSC 310 Animal Disease and Sanitation	2
DYSC 453 Animal Reproduction	3	ANSC 452 Animal Breeding	3
NUTR 401 Fundamentals of Nutrition	3	Agronomy Requirement[6]	3
Business Requirement[5]	3	Elective	2
Elective	1		
	16		16

SENIOR YEAR

ANSC 401 Beef Production	3	ANSC 408 Pork Production	3
ANSC 406 Seminar	2	ANSC 412 Horse Production	3
Communications Requirement[7]	3	Business Requirement[5]	3
Social Science Requirement[3]	3	Elective	7
Elective	6		
	17		16

135 Total Semester Hours

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[1] A minimum of 6 credits in mathematical sciences is required, excluding MTHSC 101, 115, 116, 215, 216

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] Select from ECON 211, GEOG 101, HIST 101, 102, 172, 173, POSC 101, PSYCH 201, RS(SOC) 359, 401, SOC 201

[4] Select from CAAH 115, 303; language (300 level); HUM 301 or courses in music, philosophy and religion, or courses in 200-level English literature

[5] Select from ACCT 200, 201, AGEC 202, 302, 309, 319, 409, 460, MGT 307, or courses in economics as approved by adviser

[6] Select from AGRON 421, 423, 452

[7] To be selected from ENGL 231, 301, 304, 312, 314

Note: Preveterinary students require additional credits in the following areas: biochemistry, 4 credits; organic chemistry with laboratory, 8 credits; physics with laboratory, 8 credits.

DAIRY SCIENCE MAJOR

The curriculum in Dairy Science is designed to provide the student with an understanding of scientific principles and the application of these principles in the scientific, technical, and business phases of the dairy industry. Completion of required studies in the sciences and humanities and selected courses by the student in areas of personal interest prepares the graduate for a successful chosen profession. A career in the dairy industry is a rewarding one, not only monetarily, but in rendering a service in providing a wholesome, nutritious food for mankind.

Opportunities for dairy science graduates are many. They include the management of production and processing facilities, quality control work for processing units and production organizations, industrial promotion and public relations work in both production and processing fields, dairy and food products engineering, special services, public health service, teaching and research. Special service opportunities are available in state and national breed association work, breeding organizations, industrial supplies, production and processing equipment and supplies. Opportunities in educational activities include positions with industrial associations, state and federal services and federal programs with foreign assignments.

Students majoring in Dairy Science may emphasize either Production or Manufacturing with sufficient electives to enhance their individual programs.

FRESHMAN YEAR

First Semester		Second Semester	
AGRIC 104 Intro to Plant Sciences	3	BIOL 104 General Biology II	3
BIOL 103 General Biology I	3	BIOL 106 General Biology Lab II	1
BIOL 105 General Biology Lab I	1	CH 112 General Chemistry	4
CH 101 General Chemistry	4	DYSC 101 Dairy Foods	1
ENGL 101 Composition I	3	or DYSC 102 Mammalian Reproduction	1
MTHSC 102 Intro to Math Analysis[1]	3	ENGL 102 Composition II	3
	17	MTHSC 101 Finite Probability[1]	3
		Social Science Requirement[2]	3
			18

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3	ANSC 202 Intro Animal Science	3
CH 223 Organic Chemistry	3	MICRO 305 General Microbiology	4
and CH 227 Org Chem Lab	1	Humanities Requirement[7]	3
or BIOCH 210 Elem Biochemistry	4	Science Requirement[5]	3-4
DYSC 201 Intro to Dairy Science	3	Elective	3-4
DYSC 203 Dairy Science Techniques	1		17
PS 201 Poultry Husbandry	3		
Literature Requirement[3]	3		
	17		

MANUFACTURING OPTION

JUNIOR YEAR

First Semester		Second Semester	
ACCT 200 Basic Accounting	3	AGEC 309 Economics of Agricultural Marketing	3
or ACCT 201 Prin of Accounting	3	DYSC 304 Evaluation of Dairy Products	2
DYSC 407 Market Milk	3	FDSC 422 Qual Assurance and Sens Eval	2
GEN 302 Introductory Genetics	4	FDSC 424 Qual Assurance and Sens Eval Lab	1
Communication Requirement[4]	3	MICRO 407 Food and Dairy Micro	4
Elective[6]	3	Elective[6]	4
	16		16

SENIOR YEAR

DYSC 402 Dairy Manufactures	3	DYSC 400 Cultured Dairy Products	3
DYSC 409 Dairy Sci. Seminar	2	DYSC 404 Plant Management	2
DYSC 461 Physiol. of Lactation	2	Elective[6]	11
NUTR 401 Fundamentals of Nutrition	3		16
Elective	7		
	17		

134 Total Semester Hours

PRODUCTION OPTION

JUNIOR YEAR

First Semester		Second Semester	
AGRON 202 Soils	4	AGRON 423 Field Crops—Forages	3
ANSC 301 Feeds and Feeding	3	or AGEC 302 Econ. of Farm Mgt	3
DYSC 407 Market Milk	3	ANPH 301 Physiology and Anatomy of Domestic Animals	4
GEN 302 Introductory Genetics	4	DYSC 310 Dairy Cattle Evaluation	1
Elective	2	Communication Requirement[4]	3
	16	Elective	6
			17

SENIOR YEAR

DYSC 409 Dairy Science Seminar	2	ANSC 452 Animal Breeding	3
DYSC 453 Animal Reproduction	3	DYSC 452 Dairy Cattle Feeding and Management	4
DYSC 455 Reproductive Management	1	Elective[6]	9
DYSC 461 Physiology of Lactation	2		16
NUTR 401 Fundamentals of Nutrition	3		
Elective[6]	6		
	17		

135 Total Semester Hours

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[1] Students may schedule 6 hours from MTHSC 105, 106, 108, 207, EXST 301 pursuant to satisfactory score on the College Board Achievement Test in Mathematics, Level II and as approved by adviser

[2] Select from ECON 200, 211, GEOG 101, 102, HIST 101, 102, 172, 173, POSC 201, PSYCH 201, RS (SOC) 359, 401, 471, SOC 201, 202

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] Select from ENGL 231, 301, 304, 312, 314

[5] Select from CPSC 110, 120, PHYS 122, 200, 207, or chemistry or biochemistry

[6] At least 15 hours of elective credits must be in an area supporting the student's major. See adviser for available courses

[7] Select from CAAH 115, 303, foreign language literature (300 level or higher), humanities, music, philosophy, religion, or 200-level English Literature

POULTRY SCIENCE MAJOR

This curriculum provides the student with a broad education in science and the humanities and specialized knowledge of the biology of the avian species and of the poultry industry. Avian science courses emphasize the nutrition, physiology, and pathology of domesticated and semidomesticated birds. The environmental requirements for propagating the various species and for handling eggs and meat are covered.

Minors in Business, Environmental Science, International Agriculture, Production, Science or a Second Department provide for the student's specialized interests.

Job opportunities include supervisory positions with producers of eggs, broilers, turkeys, or game birds; technical representatives for feed manufacturers, vitamin and mineral suppliers, pharmaceutical and biological houses; extension specialists; teachers or researchers; salesmen or marketing specialists; quality control and poultry products technologists; government graders, inspectors or sanitarians.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	AGRIC 104 Intro. to Plant Sciences	3
BIOL 105 General Biology Lab. I	1	BIOL 104 General Biology II	3
CH 101 General Chemistry	4	BIOL 106 General Biology Lab. II	1
ENGL 101 Composition I	3	CH 112 General Chemistry	4
MTHSC 102 Intro. to Math. Analysis[1]	3	ENGL 102 Composition II	3
PS 101 Avian Pets	1	MTHSC 101 Finite Probability[1]	3
	15		17

SOPHOMORE YEAR

AGEC 202 Agricultural Economics	3	ANSC 202 Intro. Animal Science	3
or ECON 200 Economic Concepts	3	ENGL 231 Introduction to Journalism	3
or ECON 211 Prin. of Economics	3	or ENGL 304 Business Writing	3
CH 223 Organic Chemistry[2]	3	or ENGL 314 Technical Writing	3
and CH 227 Org. Chem. Lab.	1	MICRO 305 General Microbiology	4
or BIOCH 210 Elem. Biochem.	4	PHYS 200 Introductory Physics[4]	4
or CH 201 Sur. of Org. Ch.	4	Humanities Requirement[5]	3
DYSC 201 Intro. to Dairy Science	3		17
PS 201 Poultry Husbandry	3		
Literature Requirement[3]	3		
Elective	2		
	18		

JUNIOR YEAR

ANSC 301 Feeds and Feeding	3	ANPH 301 Physiology and Anatomy of Domestic Animals	4
ENGL 301 Public Speaking	3	PS 355 Poultry Products Grading and Technology	3
GEN 302 Introductory Genetics	4	PS 402 Poultry Management	3
Minor[7]	3	PS 403 Poultry Management Lab	1
Social Science Requirement[6]	3	Minor[7]	6
	16		17

SENIOR YEAR

MGT 301 Principles of Management	3	PS 400 Avian Physiology	3
PS 451 Poultry Nutrition	2	PS 454 Least Cost Feed Form.	1
PS 453 Poultry Nutrition Lab	1	PS 460 Seminar	1
PS 458 Avian Micro. and Parasit.	4	Minor[7]	3
Minor[7]	3	Elective	9
Elective	4		17
	17		

134 Total Semester Hours

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[1] Students may schedule 6 hours from EXST 301, MTHSC 105, 106, 108 pursuant to score on the College Board Achievement Test in Mathematics, Level II and as approved by adviser.

[2] Science minors should schedule CH 223, 227. Business minors should schedule BIOCH 210.

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[4] Preveterinary students may substitute PHYS 207 for PHYS 200.

[5] See page 53.

[6] Select 3 hours from the following: GEOG 101, 102, 301, HIST 101, 102, 172, 173, 191, POSC 101, 201, PSYCH 201, RS (SOC) 359, 401, 471, SOC 201, 202.

[7] See adviser for list of minors.

ECONOMIC BIOLOGY

The Economic Biology major includes areas of concentration in Entomology, Plant Pathology, and Wildlife and Fisheries Biology.

ENTOMOLOGY CONCENTRATION

Entomology, the study of insects, is a unique scientific discipline. Insects form the largest and most widely distributed class of animals in the world, including many of the most beneficial and harmful organisms known to man.

Exciting opportunities for professional entomologists are available in many areas, such as teaching and research, the cooperative extension service, pest control, pest management consulting, industry, the armed forces medical corps, public health agencies, and quarantine and regulatory agencies. This curriculum also provides an excellent foundation for graduate studies.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
and BIOL 105 Gen. Biol Lab I	1	and BIOL 106 Gen Biol Lab II	1
or BIOL 110 Prin of Biology I	5	or BIOL 111 Prin. of Biology II	5
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 105 Algebra and Trig[1]	5	MTHSC 102 Intro. to Math Analysis	3
	16-17	or MTHSC 106 Cal. of One Var I	4
		Elective	3
			17-19

SOPHOMORE YEAR

AGRON 202 Soils	4	AGEC 202 Agriculture Economics	3
CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 227 Organic Chemistry Lab	1	GEN 302 Introductory Genetics	4
ENT 301 General Entomology	3	PHYS 200 Introductory Physics[3]	4
Humanities Requirement[2]	3	Humanities Requirement[2]	3
Elective	3		17
	17		

JUNIOR YEAR

ENGL 301 Public Speaking	3	ACCT 201 Principles of Accounting	3
ENT 405 Insect Morphology	4	or EXST 301 Intro. Statistics	3
ENT 468 Research Techniques	2	ENT 410 Insect Taxonomy	3
Computer Science Requirement[4]	2	MICRO 305 General Microbiology	4
Science Requirement[5]	4	Entomology Elective[6]	3
Elective	2	Elective	3
	17		16

SENIOR YEAR

BIOSC 441 Ecology	4	ENT 420 Toxicology of Insecticides	3
ENT 461 Directed Research in Entomology		ENT 462 Seminar	1
and Economic Zoology	1	ENT 470 Insect Physiology	3
PLPA 301 Plant Pathology	3	Entomology Elective[6]	3
Entomology Elective[6]	3	Social Science Requirement[7]	3
Social Science Requirement[7]	3	Elective	4
Elective	3		17
	17		

134 Total Semester Hours

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[1] Students who make a satisfactory score on the College Board Achievement Test in Mathematics, Level II may schedule other mathematical sciences courses in lieu of MTHSC 105, in consultation with their advisers.

[2] See page 53.

[3] Preveterinary Medicine students must substitute PHYS 207 and take PHYS 208 as a junior-year elective.

[4] Select from computer science courses or AGRIC 200 and total two or more credits.

[5] Select from any physical or biological science.

[6] At least 6 credits must be selected from the following: ENT 401, 402, 403, 404, 455.

[7] Select from anthropology, economics, geography, history, political science, psychology, or sociology (including crosslisted rural sociology courses).

PLANT PATHOLOGY CONCENTRATION

Plant pathology, the study of plant diseases, is a challenging biological and agricultural science. As a career, it is exciting, essential, and rewarding. As a profession, it requires ambition, skill, and dedication, while offering the opportunity for intellectual and personal fulfillment. Plant pathologists continually pit their abilities and energies against more than 50,000 destructive plant diseases.

Job opportunities include private consulting, cooperative extension services, agricultural sales, federal and state government and foreign service, technical work, biotechnology, various integrated pest-management programs, farming, and graduate programs. Salaries are competitive with other biological and agricultural professions.

Advisers for plant pathology undergraduates attempt to tailor the program of study to fit the student's long-term goals.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
and BIOL 105 Gen. Biol. Lab. I	1	and BIOL 106 Gen. Biol. Lab. II	1
or BIOL 110 Prin. of Biology I	5	or BIOL 111 Prin. of Biology II	5
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 102 Intro. to Math. Analysis	3	Elective	7
	14-15		18-19

SOPHOMORE YEAR

AGRIC 200 Agric. Application of Microcom	3	AGEC 202 Agricultural Economics	3
AGRON 202 Soils	4	CH 224 Organic Chemistry	3
CH 223 Organic Chemistry	3	GEN 302 Introductory Genetics	4
CH 227 Organic Chemistry Lab	1	PHYS 200 Introductory Physics	4
ENT 301 General Entomology	3	Humanities Requirement[1]	3
Humanities Requirement[1]	3		17
	17		

JUNIOR YEAR

BIOCH 301 General Biochemistry	3	BOT 421 Plant Physiology	4
MICRO 305 General Microbiology	4	BOT 431 Intro. Plant Taxonomy	4
PLPA 301 Plant Pathology	3	ENGL 301 Public Speaking	3
Departmental Requirement[2]	3	PLPA 456 Plant Virology	3
Social Science Requirement[1]	3	Elective	3
	16		17

SENIOR YEAR

BOT 411 Introductory Mycology	4	PLPA 451 Bacterial Plant Pathogens	3
EXST 301 Introductory Statistics	3	Departmental Requirement[2]	3
PLPA 458 Plant Parasitic Nematodes	3	Elective	12
Departmental Requirement[2]	3		18
Social Science Requirement[1]	3		
Elective	2		
	18		

135-137 Total Semester Hours

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[1] See page 53

[2] At least 9 credits must be selected from the following: AGRON 405, 407, 421, 422, 423, 425, 490; BIOCH 301, 423, 424, 425, 426; CH 313, 317; ENT 401, 402; HORT 201, 302, 305, 352, 455; MICRO 416; PLPA 411, 412.

WILDLIFE AND FISHERIES BIOLOGY CONCENTRATION

Increased interest in and concern for conservation of natural resources and the environment and demand for seafood products and farm-raised fish has resulted in these areas becoming increasingly technical and requiring highly qualified wildlife and fisheries biologists. Greatest demands for graduates are in the following areas: management, research, survey and regulatory positions with state and federal agencies; industrial research and quality control laboratories; conservation, recreational, and other public service agencies; private enterprises and fish farms.

The undergraduate curriculum provides a solid foundation for many career opportunities in the sciences. The curriculum is strong in basic and applied sciences, communication skills and the social sciences. Twenty-eight credit hours may be selected from emphasis areas and elective course offerings. Students select an emphasis area in either aquaculture and fisheries, wildlife management, or preveterinary medicine. These allow students to expand their knowledge of aquaculture, fisheries and wildlife or to broaden their background with courses in botany, zoology, and other sciences. In addition, six semester credits are available for field training with appropriate natural resource agencies. Students can satisfy coursework requirements for professional certification by The Wildlife Society and/or the American Fisheries Society.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
and BIOL 105 Gen Biol Lab I	1	and BIOL 106 Gen Biol. Lab II	1
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	or CH 112 General Chemistry[2]	4
MTHSC 102 Intro to Math Analysis	3	ENGL 102 Composition II	3
Social Science Requirement[1]	3	Mathematics Requirement[1]	3
	17	Elective	3
			17

SOPHOMORE YEAR

AGRON 202 Soils	4	AGEC 202 Agricultural Economics	3
BIOSC 201 Plant Diversity	4	AGRIC 200 Agric Appl of Microcomp	3
CH 201 Survey of Organic Chemistry	4	or Computer Science[3]	3
or BIOCH 210 Elem Biochem	4	BIOSC 202 Animal Diversity	4
or CH 223 Organic Chemistry	3	PHYS 200 Introductory Physics[4]	4
and CH 227 Organic Chem. Lab	1	Emphasis Area[5]	3
WFB 350 Princ Fish and Wildlife Biol	3		17
Elective	2		
	17		

JUNIOR YEAR

AGM 301 Soils and Water Conservation	3	AGEC 309 Econ. of Agric Mkt	3
ENGL 314 Technical Writing	3	or CRD 357 Nat. Res. Econ.	3
ENT 301 General Entomology	3	ANPH 301 Physiology and Anatomy	
Humanities Requirement[1]	3	of Domestic Animals	4
Emphasis Area[5]	4	EXST 301 Introductory Statistics	3
Elective	1	GEN 302 Introductory Genetics	4
	17	WFB 412 Wildlife Management	3
		Elective	1
			18

SENIOR YEAR

BIOSC 441 Ecology	4	WFB 450 Aquaculture	3
ENGL 301 Public Speaking	3	WFB 499 Wildlife and Fish Seminar	1
WFB 416 Fishery Biology	3	Humanities Requirement[1]	3
WFB 462 Wetland Wildlife Biology	3	Emphasis Area[5]	7
Emphasis Area[5]	4	Elective	3
	17		17

137 Total Semester Hours

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[1] See pages 52-53 (General Education Requirements)

[2] Students planning to take CH 223 should select CH 112

[3] To be selected from computer science courses and total three or more credits

[4] Preveterinary Medicine students must substitute PHYS 207

[5] Select 18 credits from one of the three Emphasis Areas *Aquaculture and Fisheries* AGEC 425 BIOSC 280 442 443, 483 484 485, BOT 413, ENT (SH) 430, ENT (WFB) 469 MICRO 305, 403 411, WFB 460 490 ZOOL 403 404 410, 456, 463, or courses approved by the adviser *Wildlife Biology* AGM 205 BIOSC 442 BOT 201 431 CAPL 473 ENSC 432 FOR 205, 206 302, 308, 310, 315 409 415, 416 POSC 302 WFB 490 ZOOL 415 430 456 462 464 465 470, 471 or courses approved by the adviser *Preveterinary Medicine* ANSC 202, BIOCH 301 302 CH 224 228 MICRO 305, NUTR 401, PHYS 208, or courses approved by the adviser (See Preveterinary Medicine Requirements)

FOOD SCIENCE

The Food Science major is designed to prepare students for the many career opportunities in technical and management areas of the food industry. The food industry, being the nation's largest industry, is becoming increasingly technical and requires large numbers of professional food scientists. World food supplies, particularly those rich in protein, are becoming increasingly critical in many parts of the globe. This situation is expected to accelerate the demand for food scientists.

Opportunities for graduates in Food Science include research positions in government organizations and state experiment stations; supervisory, administrative, research and quality control positions in food processing industries; inspection and grading work with state and federal agencies; consulting, teaching and extension activities with universities and colleges. Students graduating in Food Science are well prepared to pursue postgraduate training in areas such as microbiology, biochemistry, and nutrition, as well as in food science

The student majoring in Food Science will select a minor, which will emphasize training in an area other than food science and which is designed to supplement the major course of study

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
and BIOL 105 Gen Biol Lab I	1	and BIOL 106 General Biol Lab II	1
or BIOL 110 Prin of Biol I	5	or BIOL 111 Prin of Biol II	5
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
FDSC 101 Man's Struggle for Food	1	MTHSC 106 Cal of One Var I	4
MTHSC 105 Algebra and Trig[1]	5	Elective	2
	17-18		17-18

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	BIOCH 210 Elem Biochemistry	4
and CH 227 Organic Chem Lab.	1	ENGL 231 Intro to Journalism	3
or CH 201 Survey of Org Chem.	4	or ENGL 304 Business Writing	3
PHYS 122 Phys with Cal I	3	FDSC 212 Man's Food Resources	2
or PHYS 207 Gen Phys I	4	PHYS 208 General Physics II	4
Literature Requirement[2]	3	or PHYS 221 Phys with Cal. II	3
Social Science Requirement[3]	3	and PHYS 223 Physics Lab. II	1
Elective	3	Social Science Requirement[3]	3
	16-17		16

JUNIOR YEAR

EXST 301 Introductory Statistics	3	ENGL 301 Public Speaking	3
FDSC 305 Dairy and Food Engr	3	FDSC 422 Quality Assurance and Sensory Evaluation	2
MICRO 305 General Microbiology	4	FDSC 424 Quality Assurance and Sensory Evaluation Lab	1
NUTR 451 Human Nutrition	3	MICRO 407 Food and Dairy Microbiology	4
Humanities Requirement[4]	3	Minor[5]	3
Elective	1	Elective	4-3
	17		16-17

SENIOR YEAR

FDSC 401 Food Chemistry I	4	FDSC 402 Food Chemistry II	4
FDSC 403 Food Preservation and Processing I	3	FDSC 404 Food Preservation and Processing II	3
FDSC 405 Food Preservation and Processing Lab I	1	FDSC 406 Food Preservation and Processing Lab II	1
FDSC 417 Seminar	1	FDSC 418 Seminar	1
Minor[5]	6	Minor[5]	6
Elective	2	Elective	2
	17		17

134 Total Semester Hours

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[1] Students who make a satisfactory score on the College Board Achievement Test in Mathematics, Level II must schedule other mathematics courses or electives in lieu of MTHSC 105 in consultation with adviser

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] AGEC 202 and a selection of 3 credits from the following GEOG 101 or 102, HIST 101, 102, 172, 173, POSC 101, PSYCH 201, RS (SOC) 401, SOC 201

[4] At least 3 credits from art and architectural history, drama, humanities, foreign language, literature (300-level or higher), music, philosophy, religion, or visual arts courses

[5] See adviser for available minors and course requirements

HORTICULTURE

This major comprises three curricula: Fruit and Vegetable, Ornamental, and Turfgrass. There is a common core of science for all three curricula —biology, chemistry, mathematics, and physics on which a general background in horticulture is built. This emphasis on basic science studies prepares students for graduate programs. Each major develops a sound background in general horticulture and special abilities, depending on the specific curriculum the student follows. As a result, there are general career opportunities (for example, working in agricultural sales) and specific opportunities (managing a golf course for a turfgrass specialist). Career opportunities are expanded and strengthened by selection, with the help of a personal adviser, of elective courses. Students in all curricula may also participate in the internship program to develop experience in practical situations.

FRUIT AND VEGETABLE MAJOR

This curriculum provides the student with a basic education in science and the humanities, and the application of both in the scientific, technical, and business phases of the fruit and vegetable industry.

Opportunities in this field of study include vegetable and fruit farm management; inspection of fresh fruit, vegetable and other food products as well as nursery stock. There are many other opportunities as in plant breeding, agricultural extension service work, horticultural research, horticultural teaching and writing, and fruit and vegetable processing. Other occupations include sales and fieldwork with seedsmen and nurserymen, and manufacturers of food, fertilizer, and pesticide products.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	AGRIC 104 Intro to Plant Sciences	3
BIOL 105 General Biology Lab I	1	BOT 205 Plant Form and Function	4
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
CPSC 120 Intro to Inform Proc Sys	3	ENGL 102 Composition II	3
or AGRIC 200 Ag Appl Microcptr	3	MTHSC 101 Finite Probability	3
ENGL 101 Composition I	3		17
MTHSC 102 Intro Math Analysis	3		
	17		

SOPHOMORE YEAR

AGRON 202 Soils	4	ENT 301 General Entomology	3
CH 223 Organic Chemistry	3	PHYS 200 Introductory Physics	4
and CH 227 Organ Chemistry Lab	1	Humanities Requirement[3]	3
or BIOCH 210 Elem Biochemistry	4	Social Science Requirement[4]	3
or CH 201 Survey of Org Ch	4	Elective	3
HORT 201 General Horticulture	3		16
Literature Requirement[1]	3		
Social Science Requirement[4]	3		
	17		

JUNIOR YEAR

HORT 302 Prin of Veg Production	3	AGM 301 Soil and Water Cons	3
HORT 305 Plant Propagation	3	BOT 421 Plant Physiology	4
HORT 352 Commercial Pomology	3	GEN 302 Introductory Genetics	4
HORT 455 Small Fruit and Nut Crops	4	Communications Requirement[2]	3
PLPA 301 Plant Pathology	3	Horticulture Requirement[5]	3
	16		17

SENIOR YEAR

AGRON 407 Principles of Weed Control	3	HORT 410 Seminar II	1
BOT 431 Intro Plant Tax	4	HORT 456 Vegetable Crops	3
HORT 409 Seminar I	1	Horticulture Requirement[5]	3
HORT 464 Postharvest Horticulture	3	Elective	10
Horticulture Requirement[5]	3		17
Elective	3		
	17		

134 Total Semester Hours

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[1] Select from ENGL 202 203 204 205 206 207 208 209

[2] Select from ENGL 231 301 304

[3] Select from art and architectural history visual arts music drama philosophy humanities

[4] To be selected from ECON 200 HIST 101 102 172 173 POSC 101 PSYCH 201 RS (SOC) 401 SOC 201 any agricultural economics courses

[5] Select from HORT 303 304 308 310 406 407 408 412 415 416 433 454 461 462 470 471

ORNAMENTAL MAJOR

This curriculum is designed to give students a scientific background and technical facilities in the field of ornamental horticulture. Subject matter covers plant materials culture, uses, and planning of ground spaces.

Graduates find careers in nursery work, floriculture, landscape designing, landscape contracting, and park supervision. Other occupations are research personnel, teachers, extension workers, and representatives of fertilizer, machinery, and chemical companies.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	AGRIC 104 Intro. to Plant Sciences	3
BIOL 105 General Biology Lab. I	1	BOT 205 Plant Form and Function	4
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 102 Intro Math Analysis	3	MTHSC 101 Finite Probability	3
	14		17

SOPHOMORE YEAR

AGM 301 Soil and Water Conservation	3	AGRON 202 Soils	4
CH 223 Organic Chemistry	3	CPSC 120 Intro to Inform. Proc Sys	3
and CH 227 Organic Chem Lab	1	or AGRIC 200 Ag Appl of Microcom	3
or BIOCH 210 Elem Biochem	4	HORT 304 Plant Materials II	3
or CH 201 Survey of Org Chem	4	PHYS 200 Introductory Physics	4
HORT 201 General Horticulture	3	Literature Requirement[1]	3
HORT 303 Plant Materials I	3		17
Social Science Requirement[5]	3		
	16		

JUNIOR YEAR

BOT 421 Plant Physiology	4	GEN 302 Introductory Genetics	4
BOT 431 Introductory Plant Taxonomy	4	HORT 310 Floriculture	3
ENT 301 General Entomology	3	Communication Requirement[2]	3
HORT 305 Plant Propagation	3	Horticulture Requirement[3]	3
HORT 308 Landscape Design	4	Humanities Requirement[4]	3
	18	Elective	2
			18

SENIOR YEAR

HORT 409 Seminar I	1	HORT 406 Nursery Technology	3
HORT 412 Turfgrass Management	3	HORT 410 Seminar II	1
Horticulture Requirement[3]	3	PLPA 301 Plant Pathology	3
Social Science Requirement[5]	3	Horticulture Requirement[3]	3
Elective	8	Elective	6
	18		16

134 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Select from ENGL 231, 301, 304

[3] Select from HORT 302, 352, 408, 415, 416, 433, 454, 455, 456, 461, 462, 464, 470, 471

[4] Select from art and architectural history, visual arts, music, drama, philosophy, humanities

[5] Select from ECON 200, HIST 101, 102, 172, 173, POSC 101, PSYCH 201, RS (SOC) 401, SOC 201, any agricultural economics courses

TURFGRASS MAJOR

The Turfgrass curriculum is designed to prepare the student for a career in the turfgrass industry. The major course of study is supported by a complement of courses to provide the student with a strong background in plant and soil sciences and broad training in the basic sciences and humanities.

Employment opportunities include positions in the design, establishment, and maintenance of fine turf areas for functional, recreational, and ornamental uses. Turfgrass graduates also find rewarding careers as teachers, extension agents, and research technicians. Other opportunities are available in the servicing and sale of specialized turfgrass equipment, fertilizers, chemicals, seed, and sod.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	AGRIC 104 Intro. to Plant Sciences	3
BIOL 105 General Biology Lab. I	1	BOT 205 Plant Form and Function	4
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 102 Intro. Math. Analysis	3	MTHSC 101 Finite Probability	3
	14		17

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	AGRON 202 Soils	4
and CH 227 Org. Chem. Lab.	1	ENGL 304 Business Writing	3
or BIOCH 210 Elem. Biochemistry	4	or ENGL 314 Technical Writing	3
or CH 201 Survey of Org. Chem.	4	PHYS 200 Introductory Physics	4
ENT 301 General Entomology	3	Humanities Requirement[3]	3
HORT 201 General Horticulture	3	Literature Requirement[1]	3
HORT 407 Landscape Design	3	Elective	1
Social Science Requirement[4]	3		18
Elective	1		
	17		

JUNIOR YEAR

AGRON 407 Prin. of Weed Control	3	AGM 205 Principles of Farm Shop	3
HORT 305 Plant Propogation	3	AGM 301 Soil and Water Conservation	3
HORT 462 Landscape Design Im.	3	BOT 421 Plant Physiology	4
PRTM 307 Park Maintenance and Oper.	3	CPSC 120 Intro. to Inform. Proc. Sys.	3
Social Science Requirement[4]	3	or AGRIC 200 Ag. Appl. of Microcom.	3
Elective	3	Horticulture Requirement[2]	3
	18	Elective	1
			17

SENIOR YEAR

AGRON 490 Soil Org. and Crop. Prod.	3	AGRON 452 Soil Fert. and Mgt.	3
GEN 302 Introductory Genetics	4	HORT 410 Seminar	1
HORT 409 Seminar	1	PLPA 301 Plant Pathology	3
HORT 412 Turfgrass Management	3	Horticulture Requirement[2]	3
Horticulture Requirement[2]	3	Elective	6
Elective	3		16
	17		

134 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Select from HORT 302, 303, 304, 308, 310, 352, 406, 408, 415, 416, 433, 454, 455, 456, 461, 464, 470, 471

[3] Select from art and architectural history, visual arts, music, drama, philosophy, humanities

[4] Select from ECON 200, HIST 101, 102, 172, 173, POSC 101, PSYCH 201, RS (SOC) 401, SOC 201, any agricultural economics courses

PACKAGING SCIENCE

Packaging Science is a discipline that involves the use of materials, methods, and machinery to develop and produce packages that protect and preserve products, instructs the consumer in the product's proper use and helps market the product. On the basis of Gross National Product, it is the third largest industry in the United States and is truly international in character. It is an extremely dynamic field and is growing rapidly. Virtually everything grown or manufactured is packaged in some fashion. The food industry is the largest user of packages, but nonfood packaging is essential also. Tamper-evident packaging is an integral part of the pharmaceutical industry, and packaging to prevent abuse of sensitive electronic equipment is assuming greater importance as more consumers purchase computers, television sets, and microwave ovens for example.

Opportunities for employment include a wide variety of career paths; i.e., marketing, manufacturing, research and development, design, transportation and distribution. Corporations which manufacture and sell packages as well as companies that purchase and use packages need well-educated and well-trained packaging personnel. If career interests lie in the regulatory field, interesting positions exist in state and federal governments; i.e., the Department of Agriculture and the Food and Drug Administration.

The student majoring in Packaging Science will select from two options—Food Packaging and General Packaging. The basic curricula are the same, but students selecting the Food Packaging option are required to have more food-related courses than those with the General Packaging option.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 105 Algebra and Trig[1]	5	MTHSC 106 Calculus of One Var. I	4
PKGSC 101 Packaging Orientation	1	PKGSC 102 Intro. to Pkg. Science	2
	17	Elective	1
			18

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	GC 104 Graphic Arts I	3
CH 227 Organic Chemistry Lab	1	PHYS 208 General Physics II[2]	4
CPSC 110 Elem. Computer Program.[3]	3	PKGSC 204 Container Systems	2
PHYS 207 General Physics I[2]	4	PKGSC 206 Container Systems Lab	1
PKGSC 200 Pkg. Materials in Mfg.	2	Emphasis Area[4]	3
Emphasis Area[4]	5	Literature Requirement[5]	3
	18		16

JUNIOR YEAR

CHE 412 Polymer Engineering	3	ENGL 301 Public Speaking	3
EXST 301 Introductory Statistics	3	ENGL 304 Business Writing	3
MICRO 305 General Microbiology	4	PKGSC 368 Packaging and Society	3
Emphasis Area[4]	3	Emphasis Area[4]	3
Social Science Requirement[6]	3	Humanities Requirement[7]	3
Elective	2	Social Science Requirement[6]	3
	18		18

SENIOR YEAR

FDSC 401 Food Chemistry I	4	FDSC 464 Food Packaging Systems	3
FDSC 403 Food Pres. and Proc. I	3	FDSC 466 Food Packaging Sys. Lab	1
FDSC 405 Food Pres. and Proc. Lab I	1	PKGSC 404 Mechanical Properties of Materials and Prin. of Eval.	3
FDSC 417 Seminar	1	PKGSC 454 Packaging Eval. Lab	2
Emphasis Area[4]	3	Emphasis Area[4]	4
Elective	4	Elective	3
	16		16

137 Total Semester Hours

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[1] Students who make a satisfactory score on the Mathematics Test, Level II (Standard) may schedule other mathematics courses or electives in lieu of MTHSC 105, in consultation with adviser.

[2] PHYS 122, 124, 221, and 223 may be substituted.

[3] CPSC 120 may be substituted.

[4] See adviser.

[5] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[6] AGEC 202 and a selection of three credits from the following: GEOG 101 or 102, HIST 101, 102, 172, 173, POSC 101, PSYCH 201, RS (SOC) 401, SOC 201.

[7] At least 3 credits from art and architectural history, drama, humanities, foreign language literature (300-level or higher), music, philosophy, religion, or visual arts courses.

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Preveterinary Advisory Committee coordinates a program for all South Carolina residents who are interested in pursuing a career in veterinary medicine. South Carolina residents attending any college or university may apply through the South Carolina Advisory Committee to the University of Georgia College of Veterinary Medicine. Currently, the University of Georgia admits seventeen students each year through arrangements with the Southern Regional Education Board.

Tuskegee Institute in Alabama and North Carolina State have excellent programs in veterinary medicine. Application must be made directly to the respective schools. Currently, Tuskegee admits four South Carolina residents and North Carolina State admits two.

Minimum requirements for admission to a college of veterinary medicine generally include the satisfactory completion of a minimum of two years of college in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following undergraduate courses: eight semester credits each of English and physics, twelve semester credits of biology and sixteen semester credits of organic and inorganic chemistry. (Chemistry and physics courses must be at the premedical level. They may not be survey courses.) In addition, four semester credits each of microbiology and biochemistry, including laboratories, and three semester credits of animal nutrition are required. (In addition, North Carolina State requires courses in mathematics and statistics.)

Further, the South Carolina Preveterinary Committee recommends that in order to be in the best possible competitive position, the applicant complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology subjects. Considerations for selection are character, scholastic achievements, personality, health, experience with animals, general knowledge, and motivation. In the past, competition has been very keen and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary Aptitude Test.

Since out-of-state students attending Clemson University are ineligible to apply to Georgia or Tuskegee under the South Carolina quota, they should contact and subsequently satisfy the entrance requirements of the specific college(s) of veterinary medicine to which they plan to apply.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal Science, Dairy Science, Economic Zoology, or Poultry Science in the College of Agricultural Sciences and Zoology in the College of Sciences at Clemson University, the basic curricula have been designed to satisfy Georgia's entrance requirements. For further information, contact the chairperson of the Preveterinary Medicine Curriculum Committee.

COLLEGE OF ARCHITECTURE

The Clemson University College of Architecture provides coordinated preprofessional and professional degree programs at undergraduate and graduate levels in preparation for careers in architecture, building science and management, city and regional planning, and visual arts. The preprofessional offerings of the College also provide an excellent basis for graduate studies in art and architectural history and landscape architecture.

The College enjoys contracts for creative research and public service in several areas and receives an annual support budget from the Clemson Architectural Foundation to enrich its programs. It is a member of the Association of Collegiate Schools of Architecture, the Associated Schools of Construction, and the American Planning Association and is accredited by the National Architectural Accrediting Board, Association of Collegiate Schools of Planning, and the American Council for Construction Education.

The Clemson Architectural Foundation provides the Charles E. Daniel Center for Building Research and Urban Studies in Genoa, Italy. Graduate students in the College of Architecture may spend one semester at the Center in an intensive program of study and travel, while receiving full credit toward their degree.

ENTRANCE REQUIREMENTS

In the interest of both students and the conservation of University resources and to maintain a program of the highest level, admission to the College of Architecture must necessarily be on a selective basis. Annual enrollment quotas are established consistent with space available. Selection considerations include secondary school record and performance in the College Board examination (SAT) and evidence of creativity.

Students wishing admission are advised to make application to the University early in the fall of their senior year in high school and to make arrangements for a personal interview with the Dean of the College or department head as early as possible in the year before admission.

PROGRAMS OF STUDY

The programs of study in the College of Architecture all begin with a common freshman year. Upon conclusion of that year, students may elect to pursue a bachelor's degree in Design with studies in Architecture, City and Regional Planning, Landscape Architecture, or Visual Arts or to pursue the Bachelor of Science degree in Building Science and Management.

Two-year graduate programs are offered in the College that lead to professional degrees of Master of Architecture, Master of City and Regional Planning, and Master of Fine Arts, and Master of Building Science and Management.

DESIGN

The College of Architecture offers either the Bachelor of Arts or Bachelor of Science degree in Design with studies in Architecture, City and Regional Planning, and Landscape Architecture. The Bachelor of Arts degree in Design is awarded to students who complete the Visual Arts studies.

Students enrolled in second, third, or fourth year Design studies and theory courses must attain at least a 2.0 grade-point ratio in each year level (by repeating one or both semesters, if necessary) to qualify for advancement to the next year level or in the case of fourth year Design studies, to qualify for the Design degree.

ARCHITECTURE

As practicing professionals, graduates have the creative responsibility of designing the buildings which shape our physical environment. To understand the humanistic, economic and technological nature of environmental problems the student must have a sound general education. Subsequent professional education must be preparation for a life of continuing change in which the problems to be solved will be large and small, for every sort of function, in every type of climate and for every condition of budget.

The curricula leading to the BA and BS in Design degree with studies in Architecture are conceived as fundamental parts of the prescribed sequence preparing students for the professional graduate degree, Master of Architecture. An effort is made to offer balanced general education offerings coordinate with an effective core of basic professional studies.

Students who have earned baccalaureate degrees in disciplines other than architecture, who wish to pursue a professional degree in Architecture, may be admitted through the graduate school as post-baccalaureate students. Students will remain in this category for such period of time as required to attain proficiency in the core courses required in the undergraduate Design program. Upon achieving this proficiency, the student may be admitted to the graduate program.

ARCHITECTURE STUDIES

Degree: BA in Design

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 Hist. of Art and Arch. I	3	CAAH 116 Hist. of Art and Arch. II	3
CADS 151 Design Studies I	2	CADS 152 Design Studies II	2
CADS 153 Design Theory I	2	CADS 154 Design Theory II	2
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I[1]	4	MTHSC 301 Stat Theory and Methods I[1]	3
PHYS 207 General Physics I[2,3]	4	PHYS 208 General Physics[2,3]	4
	18	Elective	1
			18

SOPHOMORE YEAR

CAAH 215 Hist. of Art and Arch. III	3	CAAH 216 Hist. of Art and Arch. IV	3
CABS 201 Structures I	3	CABS 202 Structures II	3
CADS 251 Design Studies III	3	CADS 252 Design Studies IV	3
CADS 253 Design Theory III	3	CADS 254 Design Theory IV	3
Social Science Requirement[7]	3	Social Science Requirement[7]	3
Visual Arts[4]	3	Visual Arts[4]	3
	18		18

JUNIOR YEAR

CAAR 351 Design Studies V	6	CAAR 352 Design Studies VI	6
CABS 301 Structures III	3	CABS 302 Structures IV	3
Literature Requirement[5]	3	English Requirement[6]	3
Modern Language[3]	4	Modern Language[3]	4
Elective	3	Elective	3
	19		19

SENIOR YEAR

CAAR 451 Design Studies VII	6	CAAR 452 Design Studies VIII	6
CABS 304 Environmental Studies I	3	CABS 403 Environmental Systems II	3
Major Studies Elective	3	Major Studies Elective	6
Modern Language[3]	3	Modern Language[3]	3
Elective	3		18
	18		

146 Total Semester Hours

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[1] A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301.

[2] With consent of adviser, BIOL 103, 104, 105, 106, CH 101, 102, GEOL 101, 102 may be substituted for PHYS 207 and 208.

[3] With consent of adviser, modern language may be taken in the freshman and sophomore years.

[4] CAVA 205, 207, 209, 211, 213, 215, 217

[5] ENGL 202, 203, 204, 205, 206, 207, 208, 209

[6] ENGL 231, 301, 304, 312, 314

[7] See page 53.

Note: MTHSC 105 will not count toward elective credit for a degree in Design.

ARCHITECTURE STUDIES

Degree: BS in Design

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 Hist. of Art and Arch. I	3	CAAH 116 Hist. of Art and Arch. II	3
CADS 151 Design Studies I	2	CADS 152 Design Studies II	2
CADS 153 Design Theory I	2	CADS 154 Design Theory II	2
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I[1]	4	MTHSC 301 Stat. Theory and Methods I[1]	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
	18	Elective	1
			18

SOPHOMORE YEAR

CAAH 215 Hist. of Art and Arch. III	3	CAAH 216 Hist. of Art and Arch. IV	3
CABS 201 Structures I	3	CABS 202 Structures II	3
CADS 251 Design Studies III	3	CADS 252 Design Studies IV	3
CADS 253 Design Theory III	3	CADS 254 Design Theory IV	3
Social Science Requirement[5]	3	Social Science Requirement[5]	3
Visual Arts[2]	3	Visual Arts[2]	3
	18		18

JUNIOR YEAR

CAAR 351 Design Studies V	6	CAAR 352 Design Studies VI	6
CABS 301 Structures III	3	CABS 302 Structures IV	3
Major Studies Elective	3	Major Studies Elective	3
Literature Requirement[3]	3	English Requirement[4]	3
Elective	3	Elective	3
	18		18

SENIOR YEAR

CAAR 451 Design Studies VII	6	CAAR 452 Design Studies VIII	6
CABS 304 Environmental Systems I	3	CABS 403 Environmental Systems II	3
Major Studies Elective	6	Major Studies Elective	9
Elective	3		18
	18		

144 Total Semester Hours

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[1] A sequence of MTHSC 101 102 and 203 will be accepted in lieu of MTHSC 106 and 301
[2] CAVA 205, 207, 209, 211, 213, 215, 217
[3] ENGL 202, 203, 204, 205, 206, 207, 208, 209
[4] ENGL 231 301, 304 312, 314
[5] See page 53
Note MTHSC 105 will not count toward elective credit for a degree in Design

CITY AND REGIONAL PLANNING STUDIES

Degree: BA[1] or BS in Design

The city planner is concerned with the programming and guiding of urban and regional development. Our expanding society presents many unusual opportunities for planning graduates in private firms and on public agency staffs. The City and Regional Planning Studies is for students who are motivated toward work on a large scale. After completion of this study, the student is in a position to undertake work leading to the Master of City and Regional Planning or the Master of Architecture in Urban Design.

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 Hist. of Art and Arch. I	3	CAAH 116 Hist. of Art and Arch. II	3
CADS 151 Design Studies I	2	CADS 152 Design Studies II	2
CADS 153 Design Theory I	2	CADS 154 Design Theory II	2
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var I[2]	4	MTHSC 301 Stat. Theory and Meth. I[2]	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
	18	Elective	1
			18

SOPHOMORE YEAR

CAAH 215 Hist of Art and Arch. III	3	CAAH 216 Hist. of Art and Arch. IV	3
CABS 201 Structures I	3	CABS 202 Structures II	3
CADS 251 Design Studies III	3	CADS 252 Design Studies IV	3
CADS 253 Design Theory III	3	CADS 254 Design Theory IV	3
ECON 211 Principles of Economics	3	ECON 212 Principles of Economics	3
Visual Arts[3]	3	Visual Arts[3]	3
	18		18

JUNIOR YEAR

CAAR 351 Design Studies V[4]	6	CAAR 352 Design Studies VI[4]	6
or CALA 351 Design Studies V[4]	6	or CALA 352 Design Studies VI[4]	6
CABS 301 Structures III	3	CABS 304 Environmental Systems I	3
or AGM 301 Soil and Water Conserv.	3	or CABS 403 Environmental Systems V	3
or AGM 302 Rainfall, Runoff, and Erosion Cont.	3	CPSC 110 Elem. Comp. Programming	3
CAPL 411 Introduction to Planning	3	English Requirement[6]	3
Literature Requirement[5]	3	Planning Elective	3
Elective	3		18
	18		

SENIOR YEAR

CAAR 451 Design Studies VII[4]	6	CAAR 452 Design Studies VIII[4]	6
or CALA 451 Design Studies VII[4]	6	or CALA 452 Design Studies VIII[4]	6
Major Studies Elective[7]	6	Major Studies Elective[7]	6
Planning Elective	3	Planning Elective	3
Elective	3	Elective	3
	18		18

144 Total Semester Hours

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[1] Students earning credit for four semester of the same modern language may be awarded the BA degree in Design Note that only one degree in Design will be awarded

[2] A sequence of MTHSC 101 102 and 203 will be accepted in lieu of MTHSC 106 and 301

[3] CAVA 205 207 209 211 213 215 217

[4] The selection of CAAR or CALA Design Studies and electives is to be made based upon the students interest in architecture or landscape architecture

[5] ENGL 202 203 204 205 206 207 208 209

[6] ENGL 231, 301 304 312 314

[7] Major Studies electives include (but are not limited to) CAAH 405 CPSC 210 CRD (AGEC) 411 POSC 302

LANDSCAPE ARCHITECTURE STUDIES

Degree: BA[1] or BS in Design

Landscape architecture derives from the application of cultural, aesthetic, and scientific knowledge to the solution of problems of functional and aesthetic use of the land. Studio offerings at Clemson will stimulate broad problem percepts and help develop methodologies to be excercised in their solution. Landscape architecture embraces aspects of allied professions, including architecture, civil engineering, and horticulture and draws on the areas of ecology, geology, sociology, hydrology, forestry, and other social, natural, and applied sciences. This study is preparation for the pursuit of graduate study in landscape architecture.

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 Hist of Art and Arch I	3	CAAH 116 Hist of Art and Arch II	3
CADS 151 Design Studies I	2	CADS 152 Design Studies II	2
CADS 153 Design Theory I	2	CADS 154 Design Theory II	2
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal of One Variable I[1]	4	MTHSC 301 Stat Theory and Meth I[2]	3
PHYS 207 General Physics I[3]	4	PHYS 208 General Physics II[3]	4
	18	Elective	1
			18

SOPHOMORE YEAR

CAAH 215 Hist of Art and Arch III	3	CAAH 216 Hist of Art and Arch IV	3
CABS 201 Structures I	3	CABS 202 Structures II	3
CADS 251 Design Studies III	3	CADS 252 Design Studies IV	3
CADS 253 Design Theory III	3	CADS 254 Design Theory IV	3
Social Science Requirement[4]	3	Social Science Requirement[4]	3
Visual Arts[5]	3	Visual Arts[5]	3
	18		18

JUNIOR YEAR

AGM 301 Soil and Water Conservation	3	CABS 304 Environmenatl Systems I	3
or AGM 302 Rain Runoff and Eros Cont	3	or CABS 403 Environmental Systems II	3
CALA 351 Design Studies in Land Arch V	6	CALA 352 Design Studies VI	6
Landscape Architecture Elective	3	English Requirement[7]	3
Literature Requirement[6]	3	Landscape Architecture Elective	3
Elective	3	Elective	3
	18		18

SENIOR YEAR

CALA 451 Design Stud in Land Arch VII	6	CALA 452 Design Stud. in Land Arch. VIII	6
HORT 303 Plant Materials	3	Landscape Architecture Elective	9
Landscape Architecture Elective	6	Elective	3
Elective	3		18
	18		

144 Total Semester Hours

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[1] Students earning credit for 4 semesters of the same modern language may be awarded the BA in Design Note that only one degree in Design will be awarded

[2] A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301

[3] With consent of adviser, BIOL 103, 104, 105, 106, CH 101, 102, GEOL 101, 102 may be substituted for PHYS 207 and 208

[4] See page 53

[5] CAVA 205, 207, 209, 211, 213, 215, 217

[6] ENGL 202, 203, 204, 205, 206, 207, 208, 209

[7] ENGL 231, 301, 304, 312, 314

VISUAL ARTS STUDIES

Degree: BA in Design

Students whose demonstrated skills and motivation are in the areas of the visual arts may elect, after the first two years of study, to pursue the studies in Visual Arts. The student is provided with balanced general work in liberal arts and studio work in the visual arts.

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 History of Art and Arch. I	3	CAAH 116 History of Art and Arch. II	3
CADS 151 Design Studies I	2	CADS 152 Design Studies II	2
CADS 153 Design Theory I	2	CADS 154 Design Theory II	2
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal of One Var I[1]	4	MTHSC 301 Stat. Theory and Meth. I[1]	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II[2,3]	4
	18	Elective	1
			18

SOPHOMORE YEAR

CAAH 215 Hist. of Art and Arch. III	3	CAAH 216 Hist. of Art and Arch. IV	3
CABS 201 Structures I	3	CABS 202 Structures II	3
CADS 251 Design Studies III	3	CADS 252 Design Studies IV	3
CADS 253 Design Theory III	3	CADS 254 Design Theory IV	3
Social Science Requirement[8]	3	Social Science Requirement[8]	3
Visual Arts[4]	3	Visual Arts[4]	3
	18		18

JUNIOR YEAR

CAAH 303 Evol. of Visual Arts I	3	CAAH 304 Evol. of Visual Arts II	3
Literature Requirement[3,6]	3	English Requirement[3,7]	3
Modern Language[3]	4	Modern Language[3]	4
Visual Arts[4]	3	Visual Arts[4]	3
Visual Arts[5]	3	Visual Arts[5]	3
Elective	3	Elective	3
	19		19

SENIOR YEAR

CAAH 428 19th Century Visual Arts	3	CAAH 413 20th Century Visual Arts	3
Modern Language[3]	3	Modern Language[3]	3
Visual Arts[4]	3	Visual Arts[4]	3
Visual Arts[5]	3	Visual Arts[5]	3
Approved Elective	3	Approved Elective	3
Elective	3	Elective	3
	18		18

146 Total Semester Hours

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[1] A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301
[2] With consent of adviser, BIOL 103, 104, 105, 106, CH 101, 102, GEOL 101, 102 may be substituted for PHYS 207 and 208
[3] With consent of adviser, modern language may be taken in the freshman and sophomore years
[4] CAVA 205, 207, 209, 211, 213, 215, 217
[5] CAVA 305, 307, 309, 311, 313, 315, 317, 405, 407, 409, 411, 413, 415, 417
[6] ENGL 202, 203, 204, 205, 206, 207, 208, 209
[7] ENGL 231, 301, 304, 312, 314
[8] See adviser

BACHELOR OF SCIENCE IN BUILDING SCIENCE AND MANAGEMENT

As the largest single industry in the United States and one of the most important, construction offers unlimited opportunities to highly motivated and professionally educated young men and women. Future professionals must be skilled in managing people, equipment, and capital, coupled with a grasp of construction materials and methods and the complex technologies of modern construction. The Building Science and Management curriculum is the basis for either a career in construction or as a developer or building management specialist.

FRESHMAN YEAR

First Semester		Second Semester	
CAAH 115 Hist. of Art and Arch. I	3	CAAH 116 Hist. of Art and Arch. II	3
CADS 151 Design Studies I	2	CADS 152 Design Studies II	2
CADS 153 Design Theory I	2	CADS 154 Design Theory II	2
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I[1]	4	MTHSC 301 Stat. Theory and Meth. I[1]	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
	18	Elective	1
			18

SOPHOMORE YEAR

CABS 201 Structures I	3	ACCT 203 Financial Accounting	3
CE 203 Mats. and Methods of Const.	3	CABS 202 Structures II	3
CPSC 120 Intro. to Infor. Proc. Systems	3	CABS 204 Contract Documents	3
ECON 211 Principles of Economics	3	CE 201 Surveying	3
Literature Requirement[3]	3	ECON 212 Principles of Economics	3
Elective	3	Elective	3
	18		18

JUNIOR YEAR

CABS 301 Structures III	3	CABS 302 Structures IV	3
CABS 351 Const. Management I	3	CABS 303 Soils and Foundations	3
English Requirement[4]	3	CABS 304 Environmental Systems I	3
Visual Arts[2]	3	CABS 352 Const. Management II	3
Major Elective[5]	3	LAW 312 Commercial Law	3
Elective	3	Major Elective[5]	3
	18		18

SENIOR YEAR

CABS 401 Formwork and Placing Const.	3	CABS 402 Heavy Const Equipment	3
CABS 451 Const. Management III	3	CABS 452 Const Management IV	3
CABS 461 Const. Economic Seminar	3	Major Elective[5]	9
Major Elective[5]	6		15
	15	138 Total Semester Hours	

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[1] A sequence of MTHSC 101, 102 and 203 will be accepted in lieu of MTHSC 106 and 301

[2] CAVA 205, 207, 209, 211, 213, 215, 217

[3] ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] ENGL 231, 301, 304, 312, 314

[5] Select from ECON 301, 302, FIN 305, 306, 307, 407, LAW 313, 401, MGT 307, 415, 416, MASC 310, 312, MKT 301, SH 410, or as approved by adviser

Note A minimum grade of C is required in each of the following courses CABS 203, 204, 303, 304, 351, 352, 401, 402, 451, 452, 461

COLLEGE OF COMMERCE AND INDUSTRY

The programs of the College of Commerce and Industry embrace three major areas: teaching, research, and public service. The College is responsible for eight graduate programs (two in cooperation with other administrative units), ten undergraduate programs, and a series of professional development courses for business and industry. The undergraduate curricula are in the areas of Accounting, Economics, Financial Management, Industrial Management, Management, Marketing, Textile Chemistry, Textile Science, and Textile Management. These curricula are designed to prepare the student for a variety of careers, as well as to furnish an education on which to build for a lifetime. The curricula recognize the need for an understanding of the basic principles of science and appreciation for the nature of human interaction, and the comprehension of the economic, political, and social environment. Flexibility in course selection and choice of areas for emphasis is made possible by secondary concentrations and minors as indicated.

ACCOUNTING

This curriculum leads to the Bachelor of Science degree in Accounting. The degree program is accredited by the American Assembly of Collegiate Schools of Business and is designed to prepare students for professional careers in accounting and management. The major study of accounting is well supported by sequential courses in English, mathematics, management, economics, and computer science.

The graduate in Accounting is well prepared for entrance into law school, graduate school, or the practice of accountancy, either public, private, or governmental. The study of accounting in preparation for a career in other areas of management will provide mastery over an essential tool which reinforces experience and judgement in the decision-making process.

FRESHMAN YEAR

First Semester		Second Semester	
ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
ENGL 101 Composition I	3	CPSC 120 Intro. to Inf. Proc. Sys.	3
MTHSC 102 Intro. to Math. Analysis[1]	3	ENGL 102 Composition II	3
Laboratory Science Sequence	4	MTHSC 207 Multivariable Calculus[1]	3
Social Science Requirement[2]	3	Laboratory Science Sequence	4
Elective	1		16
	17		

SOPHOMORE YEAR

CPSC 130 Data Processing with Cobol	3	ECON 212 Principles of Economics	3
ECON 211 Principles of Economics	3	ENGL 301 Public Speaking	3
MTHSC 301 Stat. Theory and Meth. I	3	MASC 312 Decision Models for Mgt.	3
Literature Requirement[4]	3	PHIL 344 Business Ethics	3
Elective	3	Social Science Requirement[2]	3
	15	Elective	3
			18

JUNIOR YEAR

ACCT 301 Intermediate Accounting	3	ACCT 302 Intermediate Accounting	3
ACCT 303 Cost Accounting	3	ACCT 422 Accounting Infor Systems	3
FIN 311 Financial Management I	3	ENGL 304 Business Writing	3
MGT 301 Principles of Management	3	FIN 312 Financial Management II	3
MKT 301 Principles of Marketing	3	LAW 312 Commercial Law	3
	15		15

SENIOR YEAR

ACCT 401 Financial Acct Problems	3	ACCT 407 Accounting Research	1
ACCT 404 Individual Taxation	3	ACCT 410 Budget and Exec Control	3
or ACCT 405 Corporate Taxation	3	ACCT 411 Financial Acct Problems	3
ACCT 415 Auditing	3	MGT 415 Business Strategy	3
Accounting Requirement[5]	3	Accounting Requirement[5]	3
Elective	3	Elective[3]	3
	15		16

127 Total Semester Hours

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[1] Either MTHSC 102 or 106 and either MTHSC 207 or 108 may be taken to satisfy the freshman mathematics requirements Use elective credits to satisfy the difference in hours

[2] Selected from SOC 201, PSYCH 201, and either POSC 101 or 201

[3] Elective credits may be taken in any combination of 1-, 2-, 3-, or 4-hour courses, but see footnote 1 above

[4] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209 or a foreign language literature at the 300-level or higher

[5] Select from ACCT 403, 404, 405, 416, 425, 430

Notes

1 Accounting majors are required to earn a grade of C or higher in all prerequisite accounting courses in order to be eligible for enrollment in the next higher-level accounting course

2 MTHSC 101 and 105 may not be counted in computing the minimum number of credit hours required for graduation with a BS in Accounting degree

ECONOMICS

A bachelor's degree in Economics provides a thorough understanding of the economic system and prepares the student for a broad choice of career opportunities. By combining general education courses, a minor or option, and a strong major in economics, students can prepare themselves for specialized graduate studies and careers in business and government.

The Department of Economics offers two degree paths for the undergraduate. The Bachelor of Arts degree is distinguished by its emphasis on the language skills and the humanities. A broad choice of minors is available for this program. The Bachelor of Science program emphasizes quantitative skills and particular preparations for careers in business and offers a structured selection of options.

BACHELOR OF ARTS IN ECONOMICS

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem. Comp. Prog.	3	ENGL 102 Composition II	3
or CPSC 120 Intro. to Inf. Proc. Sys.	3	HIST 172 Western Civilization	3
ENGL 101 Composition I	3	MTHSC 101 Finite Probability[1]	3
MTHSC 102 Intro. to Math. Analysis[1]	3	Modern Language[6]	4
Modern Language[6]	4	Science Requirement[2]	4
Science Requirement[2]	4	Elective	1
Elective	1		18
	18		

SOPHOMORE YEAR

ECON 211 Principles of Economics	3	ECON 212 Principles of Economics	3
HIST 173 Western Civilization	3	MTHSC 207 Multivariable Cal [1]	3
MTHSC 203 Elem Stat Inference[1]	3	Literature Requirement[3]	3
Literature Requirement[3]	3	Modern Language[6]	3
Modern Language[6]	3	Social Science Requirement[4]	3
Elective	1	Elective	2
	16		17

JUNIOR YEAR

ACCT 200 Basic Accounting	3	ECON 407 National Income and Employment Analysis	3
or ACCT 201 Prin of Acct	3	Social Science Requirement[4]	3
ECON 314 Inter Econ Theory	3	Major[5]	3
ENGL 304 Business Writing	3	Minor	6
or ENGL 301 Public Speaking	3		15
Major[5]	3		
Minor	3		
	15		

SENIOR YEAR

Major[5]	6	Major[5]	6
Minor	6	Elective	10
Elective	3		16
	15		

130 Total Semester Hours

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[1] The sequence MTHSC 101 102 203 207 may be replaced either by MTHSC 102 207 210, 301 or 106 207, 210 301

[2] Two courses totaling eight hours in the same science are required

[3] Select from ENGL 202 203 204, 205 206, 207, 208, 209

[4] See page 53

[5] Twenty four semester hours in economics above the sophomore level are required including ECON 314 and 407 ECON 101 and 203 do not count toward the major Major credit may include up to 6 hours selected from HIST 306 IE 484 MGT 406 (Those seeking certification will be required to complete more than 130 semester hours)

[6] Two years of the same language are required

MINOR CONCENTRATION

Any minor approved by the College of Liberal Arts, including the Cluster Minor, and any minor concentration offered by any other department in the College of Commerce and Industry is acceptable as a minor for the Bachelor of Arts curriculum in Economics.

Students who wish to combine the curriculum in Economics with secondary school teaching should elect to take the degree in Education with a teaching area in Economics. The courses will be those required for teaching certification as specified by the South Carolina Department of Education as well as those economics courses required for an Economics major. Requirements for a major in Education with a teaching area in Economics are shown under the College of Education

A minor in Economics is provided for other degree programs consisting of 15 hours above the sophomore level which must include ECON 314 and 407

BACHELOR OF SCIENCE IN ECONOMICS

FRESHMAN YEAR

First Semester		Second Semester	
ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
ENGL 101 Composition I	3	ENGL 102 Composition II	3
HIST 172 Western Civilization	3	HIST 173 Western Civilization	3
MTHSC 106 Cal of One Var I[1]	4	MTHSC 207 Multivariable Calculus[1]	3
Science Requirement[2]	4	Science Requirement[2]	4
	17	Elective	1
			17

SOPHOMORE YEAR

CPSC 110 Elem Comp Prog	3	ECON 212 Principles of Economics	3
or CPSC 120 Intro to Inf Proc Sys[4]	3	FIN 306 Corporation Finance[14]	3
ECON 211 Principles of Economics	3	MTHSC 210 Applied Matrix Alg[1]	3
MTHSC 301 Stat Theory and Meth I[1]	3	Literature Requirement[3]	3
Literature Requirement[3]	3	Social Science Requirement[15]	3
Social Science Requirement[15]	3	Elective	1
Elective	1		16
	16		

JUNIOR YEAR

ECON 314 Inter Econ Theory	3	ECON 407 National Income and Employment Analysis	3
LAW 312 Commercial Law	3	ENGL 301 Public Speaking	3
or LAW 322 Legal Envir of Bus	3	or ENGL 304 Business Writing	3
Major[6]	3	Major[6]	3
Option	3	Option	3
Elective	4	Elective	3
	16		15

SENIOR YEAR

Major[6]	6	Major[6]	6
Option	6	Option	5-3
Elective	6	Elective	6-8
	18		17

132 Total Semester Hours

OPTIONS

Rather than having a minor or secondary concentration as in the Bachelor of Arts program in Economics, a student in the Bachelor of Science program selects one of several options. These options generally consist of 15 hours of a certain core of study. It is felt that these options might be particularly appealing to certain students with definite vocational interests. Also, an appropriately chosen option would greatly facilitate moving into a Master of Business Administration program in graduate school or law school.

Students enrolling in the Bachelor of Science program in Economics may select from the following options.

Accounting[7]		**Management Science**	
ACCT 301 Inter. Accounting	3	ACCT 303 Cost Accounting	3
ACCT 302 Inter. Accounting	3	or ACCT 404 Individual Taxation	3
ACCT 303 Cost Accounting	3	or LAW 312 Commercial Law	3
and ACCT 404 Individual Taxation	3	ECON (MASC) 311 Intro. to Econometrics	3
or ACCT 411 Fin. Acct. Prob.	3	MASC 413 Management Sci. I	3
and ACCT 415 Auditing	3	Quantitative Requirement[8]	6
LAW 313 Commercial Law	3		15
	15		

Computer Science

Select at least 15 hours from the following

ECON (MASC) 311 Intro to Econometrics	3
MGT 299 Computer Utilization I	1
MGT 418 Management Inform Sys	3
and MGT 399 Mgt Applications of Microcomputers	2
Computer Science Requirement[10]	

Environmental Studies

AGEC 403 Land Economics	3
BOT 145 Environmental Dynamics	2
CRD 357 Nat Res Economics	3
ENSC 471 Man and His Environ	2
ENSC 472 Environ Plan and Cont	2
FOR 304 Forest Economics	3
	15

Social Science

HIST 306 Amer Econ Develop	3
POSC 321 Gen Public Admin	3
or POSC 361 Inter Politics	3
SOC 330 Industrial Sociology	3
Elective[5]	6
	15

Urban Studies

CRD (AGEC) 411 Regional Impact Analysis	2
MGT 406 Location Economics	3
POSC 423 Municipal Administration	3
SOC (RS) 303 Meth of Social Research I	3
SOC 331 Urban Sociology	3
	14

Finance[14]

Select 15 hours from the following

FIN (ECON) 304 Risk and Insurance	3
FIN (ECON) 305 Investment Analysis	3
FIN 307 Principles of Real Estate	3
FIN 308 Fin Inst and Mkts	3
FIN 312 Financial Management II	3
FIN 402 Asset Management	3
FIN 404 Mgt of Corp Cap Structure	3
FIN 405 Port Mgt and Theory	3
FIN 408 Mgt of Financial Inst	3

Mathematical Sciences—Statistics

ECON 430 Math Economics	3
ECON (MASC) 311 Intro to Econometrics	3
MTHSC 311 Linear Algebra	3
MTHSC 405 Stat Theory and Meth II	3
MTHSC 440 Linear Programming	3
	15

Public Administration[9]

POSC 302 State and Local Govt	3
POSC 321 Gen Public Admin	3
POSC 422 Public Policy Analysis	3
POSC 423 Municipal Admin	3
POSC 425 Grants and Govt Bud Proc	3
	15

Textile Science

TEXT 175 Intro to Textile Mfg	3
TEXT 305 Basic Fibers	3
TEXT 306 Yarn Formation	3
TEXT 313 Fabric Formation	3
TEXT 314 Dyeing and Finishing	3
TEXT 475 Textile Marketing	3
	18

International Management[11]

MGT 301 Principles of Management	3
MGT 400 Mgt of Org Beh	3
or MGT 415 Business Strategy	3
POSC 361 International Politics	3
Modern Language[12]	8
	17

Marketing

MKT 301 Principles of Marketing	3
MKT 402 Consumer Behavior	3
MKT 431 Marketing Research	3
Marketing Elective[13]	6
	15

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[1] The sequence of MTHSC 106 207, 210 301 may be replaced by MTHSC 102 207, 210 301 or 101 102 203 and 207

[2] Two courses totaling 8 credits in the same science are required

[3] Select from ENGL 202 203 204 205 206 207, 208 209

[4] CPSC 110 should be selected for the Computer Science and Mathematical Sciences-Statistics options CPSC 120 should be selected for the Management Science and Accounting options

[5] Select from 300- and 400-level courses in geography history political science psychology and sociology

[6] Twenty-four hours in economics above the sophomore level are required including ECON 314 and 407 ECON 101 and 203 do not count toward the major Major credit may include up to 6 credits selected from HIST 306 IE 484 MGT 406

[7] Students in the Accounting option should select LAW 312 in lieu of LAW 322 in the junior year

[8] Select from ECON 430 ECON (MGT) 409 MASC 414 MTHSC 405

[9] Students in the Public Administration option are required to take POSC 101 and 201 ECON 309 and 420 are to be included in the major

[10] Select from any 200- 300- and 400-level computer science courses

[11] Students in the International Management option are required to take POSC 101 201, ECON 412 is to be included in the major

[12] Two semesters of the same language are required

[13] Select from AGEC 351 or any 400-level marketing course

[14] Students in the Finance option should select FIN 311 312 in lieu of FIN 306 during the sophomore year

[15] See page 53

FINANCIAL MANAGEMENT

The degree program for the Bachelor of Science in Financial Management is accredited by the American Assembly of Collegiate Schools of Business. The curriculum provides the student with a course of study in preparation for a career in such areas as corporate finance, banking, insurance, brokerage, real estate financing, and investment services. The student should be well prepared to serve on the financial staff of practically any business firm for the purpose of planning, providing, and controlling the capital of the firm. This curriculum should also prepare the student for service with government agencies and programs. The graduate with this degree should be well prepared for entrance into Master of Business Administration, Law, or other graduate programs.

FRESHMAN YEAR

First Semester		Second Semester	
ECON 211 Principles of Economics	3	CPSC 120 Intro to Infor. Process Sys	3
ENGL 101 Composition I	3	ECON 212 Principles of Economics	3
MTHSC 102 Intro. to Math. Analysis[1]	3	ENGL 102 Composition II	3
Laboratory Science Requirement[2]	4	MTHSC 207 Multivariable Calculus[1]	3
Social Science Requirement[3]	3	Laboratory Science Requirement[2]	4
Elective	1		16
	17		

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
LAW 312 Commercial Law	3	ENGL 304 Business Writing	3
MTHSC 301 Stat. Theory and Meth. I	3	MASC 310 Intro. to Management Science	3
Literature Requirement[4]	3	PSYCH 201 Introduction to Psychology	3
Elective	3	Humanities Requirement[5]	3
	15	Elective	3
			18

JUNIOR YEAR

ACCT 301 Intermediate Accounting	3	ACCT 302 Intermediate Accounting	3
ECON 302 Money and Banking	3	FIN (ECON) 305 Investment Analysis	3
ENGL 301 Public Speaking	3	FIN 307 Principles of Real Estate	3
FIN 311 Financial Management I	3	FIN 308 Financial Institutions and Mkts.	3
MGT 301 Principles of Management	3	FIN 312 Financial Management II	3
	15		15

SENIOR YEAR

FIN (ECON) 304 Risk and Insurance	3	MGT 415 Business Strategy	3
MGT 402 Product. and Operat. Mgt. I	3	Concentration Area[7]	9
MKT 301 Principles of Marketing	3	Elective	3
Accounting Elective[6]	3		15
Concentration Area[7]	6		
	18		

129 Total Semester Hours

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[1] Credits earned in MTHSC 106 and 108 may be substituted for MTHSC 102 and 207, respectively, and 1 or 2 elective hours.

[2] See page 52.

[3] Select from any history course except HIST 198 or from POSC 201.

[4] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209, or a foreign language literature at the 300 or higher level.

[5] Select from art history, drama, humanities, music, philosophy, religion, visual arts, 200-level sophomore literature, or 300-level foreign language literature.

[6] Accounting electives may be selected from any 300- or 400-level course offered by the School of Accountancy. Credit may not be received for both ACCT 303 and 307.

[7] Fifteen semester hours from one of the following Concentration Areas along with its corresponding courses. A Concentration Area should be selected by the end of the second semester of the student's Junior year in consultation with adviser.

Accounting FIN 402, 404, and three Accounting Electives. (See footnote 6.)

Corporate Finance FIN 402, 404, 411 or 406 and two Business Electives. (See note 3 below.)

Financial Institutions FIN 405, 408, 406 or 407, and two Business Electives. (See note 3 below.)

International Finance ACCT 403, ECON 412, FIN 406, 411, MGT 423

Real Estate AGEC 413, FIN 407, LAW 333 or FIN 405 and two Business Electives. (See note 3 below.)

Notes

1. Financial Management majors are required to have a grade-point ratio of at least 2.0 in all FIN-designated courses in order to graduate. Only the last grade for courses that are repeated counts for computing the required grade-point ratio. MTHSC 101 may not be used as elective credit toward requirements for graduation with a BS in Financial Management.
2. No more than 60 percent of coursework may be taken in the College of Commerce and Industry.
3. Business Electives may be selected from any 300- or 400-level course offered by the College of Commerce and Industry or from any computer science course.

INDUSTRIAL MANAGEMENT

The Bachelor of Science degree in Industrial Management is designed primarily to prepare students for management challenges in the areas of manufacturing, production planning, inventory control, quality assurance, and service operations. Industrial management students receive a broad-based education in business, but particular emphasis is placed on systems, theories, and issues dealing with the production of goods and services. The Industrial Management program is particularly relevant in today's economic environment, where improvements in productivity and quality are essential to meet the growing challenges of foreign producers in many industries. In addition to jobs in manufacturing management, graduates of the Industrial Management program are sometimes sought for positions as project directors by various government agencies and research centers. Banks and financial institutions have found the industrial management graduate well prepared for internal operations management as well as for liaison positions dealing with manufacturing companies as bank customers. The program also provides an excellent background for students interested in careers as technical sales representatives. The Industrial Management program is accredited by the American Assembly of Collegiate Schools of Business

FRESHMAN YEAR

First Semester		Second Semester	
ECON 211 Principles of Economics	3	CPSC 120 Intro. to Infor. Proc. Sys.	3
ENGL 101 Composition I	3	ECON 212 Principles of Economics	3
MTHSC 106 Cal. of One Var. I	4	ENGL 102 Composition II	3
Science Requirement[2]	4	MTHSC 108 Cal. of One Var. II	4
Social Science Requirement[1]	3	Science Requirement[2]	4
	17		17

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
IE 265 Work Meth. and Measurement I	3	LAW 322 Legal Environ. of Business	3
MGT 299 Computer Utilization I	1	MASC 310 Intro. to Management Science	3
MTHSC 301 Stat. Theory and Meth. I	3	MGT 399 Mgt. Appl. of Microcomputers	2
Literature Requirement[3]	3	Elective	5
Elective	3		16
	16		

JUNIOR YEAR

ACCT 307 Managerial Accounting	3	FIN 306 Corporation Finance	3
ENGL 304 Business Writing	3	MASC 413 Management Science I	3
or ENGL 314 Technical Writing	3	MGT 307 Personnel Management	3
ENGL 364 Organizational Comm.	3	MGT 418 Mgt Infor Sys	3
MGT 301 Principles of Management	3	PHIL 344 Business Ethics	3
MKT 301 Principles of Marketing	3	Concentration Area[4]	3
Elective	2		18
	17		

SENIOR YEAR

ECON (MGT) 409 Managerial Economics	3	MGT 404 Adv Stat Qual Control	3
MASC 414 Statistical Analysis	3	MGT 408 Prod and Ops Mgt II	3
MGT 400 Mgt of Organizational Behav	3	MGT 415 Business Strategy	3
MGT 402 Prod and Op Mgt I	3	MGT 423 International Business Mgt.	3
MGT 405 Economics of Trans	3	MGT 430 Senior Seminar in Mgt.	3
or MGT 417 Logistics Mgt	3	Concentration Area[4]	3
Concentration Area[4]	3		18
	18		

137 Total Semester Hours

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[1] Select from anthropology, economics (including crosslisted agricultural economics courses), geography, history, political science, psychology, or sociology (including crosslisted rural sociology courses)

[2] A two-semester sequence in the same physical or biological science, each including a laboratory

[3] Select from sophomore literature courses (200-level only) or foreign language literature courses (300-level or higher)

[4] Minimum of 9 semester hours, beyond required courses, in any one of the following areas

Business Planning FIN 312 and 6 hours to be chosen from ACCT 410, FIN 308, 408, or MKT 426 A student selecting this option must substitute FIN 311 for 306 from the required courses

Industrial Engineering IE 306, 366, 452, 465, 482, 484, 488

Management Support Systems CPSC 130, 210 and either 240, 260, 360

Textiles Manufacturing TEXT 460, 470 and 471 plus TEXT 176, 201, 202, 308, 314

Transportation and Logistics MGT 405, 406, 417 424

MANAGEMENT

The Bachelor of Science degree in Management is designed to prepare students for careers as professional managers in corporations, governmental organizations, and small businesses. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in business and public administration, law, and the social sciences. The curriculum gives the student a broad exposure to the functional areas of business and allows each to select an area of concentration in a subject that is germane to individual career interests.

The Management curriculum provides (1) an examination of the social, legal, political, and economic environments in which organizations must operate; (2) an understanding of the functional areas of business and their interrelationships; and (3) a knowledge of behavioral science, applied statistics, and mathematics as they relate to organizational problem solving. The program is accredited by the American Assembly of Collegiate Schools of Business.

FRESHMAN YEAR

First Semester		Second Semester	
ECON 211 Principles of Economics	3	CPSC 120 Intro. to Inform. Proc. Sys.	3
ENGL 101 Composition I	3	ECON 212 Principles of Economics	3
MTHSC 102 Intro. to Math. Analysis	3	ENGL 102 Composition II	3
PSYCH 201 Introduction to Psychology	3	MTHSC 207 Multivariable Calculus	3
or SOC 201 Intro. to Soc.	3	Science Requirement[1]	4
Science Requirement[1]	4		16
	16		

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
MGT 299 Computer Utilization I	1	LAW 322 Legal Environment of Business	3
MTHSC 301 Stat. Theory and Meth. I	3	MASC 310 Intro. to Mgt. Sci.	3
Economics Requirement[3]	3	MGT 399 Mgt. Application of Microcomputers	2
Literature Requirement[2]	3	Elective	4
Elective	3		
	16		15

JUNIOR YEAR

ACCT 307 Managerial Accounting	3	ENGL 304 Business Writing	3
MASC 312 Dec. Models for Mgt.	3	or ENGL 314 Technical Writing	3
MGT 301 Principles of Management	3	ENGL 364 Organizational Communication	3
MKT 301 Principles of Marketing	3	FIN 306 Corporation Finance	3
PHIL 344 Business Ethics	3	MGT 307 Personnel Management	3
Elective	2	Area Concentration[4]	3
	17	Elective	1
			16

SENIOR YEAR

MGT 402 Prod. and Op. Mgt. I	3	MGT 400 Mgt. of Organizational Behav.	3
MGT 418 Management Info. Sys.	3	MGT 408 Prod. and Operations Mgt. II	3
MGT 423 International Business Management	3	MGT 415 Business Strategy	3
Area Concentration[4]	9	MGT 430 Senior Seminar in Management	3
		Area Concentration[4]	3
	18		15

129 Total Semester Hours

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[1] A two-semester sequence in the same physical or biological science, each including a laboratory.

[2] Select from sophomore literature courses (200-level only) or foreign language literature courses (300-level or higher).

[3] Select from ECON 301, 302, 308, 309, 314, 412.

[4] Fifteen semester hours, beyond required courses, in any 300- or 400-level course in the College of Commerce and Industry, Department of Industrial Engineering, or Department of Computer Science. Specific recommendations are available through the departments of Management, Accounting, Economics, Finance, Marketing, Textiles, Computer Science, and Industrial Engineering. Students should select their area of concentration as soon as possible.

MANAGEMENT—SAFETY AND HEALTH MANAGEMENT

The Bachelor of Science degree in Management with the Safety and Health Management major is designed to give students a solid background in management, as well as an indepth knowledge of the field of safety and health. This course of study prepares students to fulfill industry's increasing need for managers knowledgeable in the area of hazard management, industrial hygiene, insurance, loss control and risk management, personnel, production management, and industrial relations. In addition, the program lays a firm foundation for graduate studies in management, public health or medicine, industrial hygiene and toxicology, safety, and law.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 102 General Chemistry	4
CPSC 120 Intro. to Inform. Proc. Sys.	3	ECON 212 Principles of Economics	3
ECON 211 Principles of Economics	3	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 207 Multivariable Calculus	3
MTHSC 102 Intro. to Math. Analysis	3	Elective	3
Elective	1		16
	17		

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
MGT 299 Computer Utilization I	1	LAW 322 Legal Environment of Business	3
MTHSC 301 Stat Theory and Meth I	3	MASC 310 Intro. to Management Science	3
SH 300 Safety and Health Mgt Prin	3	MGT 399 Mgt. Application of Microcomputers	2
Literature Requirement[1]	3	SH 305 Fund of Ind Hygiene	3
Elective	3	Elective	3
	16		17

JUNIOR YEAR

ACCT 307 Managerial Accounting	3	FIN 306 Corporation Finance	3
MASC 312 Dec Models for Mgt	3	MGT 307 Personnel Management	3
MGT 301 Principles of Management	3	MGT 402 Prod and Operations Mgt I	3
MKT 301 Principles of Marketing	3	SH 302 Indust Accident Prevention and Loss Control II	3
SH 301 Indust Accident Prevention and Loss Control I	3	SH 307 Industrial Hygiene Practice	4
SH 306 Indust Hygiene Management	3		
	18		16

SENIOR YEAR

ENGL 304 Business Writing	3	ENGL 301 Public Speaking	3
or ENGL 314 Technical Writing	3	MGT 415 Business Strategy	3
MGT 400 Mgt of Org Behavior	3	MGT 402 Fire Protection and Prevention	3
MGT 408 Prod and Operations Mgt II	3	SH 404 Seminar in Safety and Health	3
MGT 418 Mgt Information Systems	3	SH 407 Directed Research	1
SH 401 Fund of Fire and Explosion	3	Humanities Elective[2]	3
	15		16

131 Total Semester Hours

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[1] Select from sophomore literature courses (200-level only) or foreign language literature courses (300-level or higher)

[2] Select from the following (excluding practical) art and architectural history, drama, foreign language literature (300-level or higher), humanities, music, philosophy, religion, visual arts, or sophomore literature courses (200-level only)

MARKETING

FRESHMAN YEAR

First Semester		Second Semester	
ECON 211 Principles of Economics	3	CPSC 120 Intro to Inf Proc Sys	3
ENGL 101 Composition I	3	ECON 212 Principles of Economics	3
MTHSC 102 Intro to Math Analysis	3	ENGL 102 Composition II	3
PSYCH 201 Introduction to Psychology	3	MTHSC 207 Multivariable Calculus	3
or SOC 201 Intro. to Sociology	3	Science Requirement[1]	4
Science Requirement[1]	4		
	16		16

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
MGT 299 Computer Utilization I	1	LAW 322 Legal Environ. of Business	3
MTHSC 301 Stat. Theory and Meth. I	3	MASC 310 Intro. to Mgt. Science	3
Economics Requirement[2]	3	MGT 399 Mgt. Application of Microcomp.	2
Literature Requirement[3]	3	Elective	4
Elective	3		
	16		15

JUNIOR YEAR

ACCT 307 Managerial Accounting	3	ENGL 364 Organizational Com.	3
ENGL 304 Business Writing	3	FIN 306 Corporate Finance	3
or ENGL 314 Technical Writing	3	MGT 307 Personnel Management	3
MASC 312 Dec. Mod. for Management	3	MKT 402 Consumer Behavior	3
MGT 301 Principles of Management	3	MKT 431 Marketing Research	3
MKT 301 Principles of Marketing	3	Elective	1
Elective	2		
	17		16

SENIOR YEAR

MGT 402 Prod and Ops Mgt I	3	MGT 400 Mgt of Organ Behavior	3
MGT 418 Management Info Systems	3	MGT 415 Business Strategy	3
MGT 423 International Bus Management	3	MKT 450 Marketing Management	3
or MKT 427 International Markets	3	College Elective[5]	3
PHIL 344 Business Ethics	3	Marketing Elective[4]	3
Marketing Elective[4]	6		15
	18		

129 Total Semester Hours

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[1] A two-semester sequence in the same physical or biological science each including a laboratory

[2] Select from ECON 301 302 308 309 314 412

[3] Select from sophomore literature courses (200-level only) or foreign language literature courses (300-level or higher)

[4] Any 400-level marketing course

[5] Any 300- or 400-level course from the College of Commerce and Industry with the exception of the required courses

TEXTILE CHEMISTRY, TEXTILE MANAGEMENT, AND TEXTILE SCIENCE PROGRAMS

The textile student studies the production of fibers by man and nature, the processes for converting these fibers into a textile structure, the science of the addition of coloring agents and finishes to improve the desirability, and the test methods for evaluating the performance of textile products

Graduates of the School of Textiles hold jobs with responsibilities in corporate management, sales, manufacturing management, design, research, development, technical service, quality control, and personnel management They create new products and processes and solve problems They create styles, patterns, textures, and colors for apparel, home, and industrial use as well as special application They deal with computers, automation, product quality, plant performance, environmental control, and consumer safety

The textile industry has a continuing need for technically trained men and women to help it meet sociologically desirable standards such as those required by the Occupational Safety and Health Act, the Consumer Product Safety Commission, and the Environmental Protection Agency In addition, there is a need to reduce costs and increase exports, and to develop new fibers and fabrics to satisfy the whims of fashion In the textile curricula a broad background is stressed, with as much as two-thirds of the courses coming from the large resources of the University outside the School of Textiles.

The School of Textiles offers three undergraduate degrees which differ in the content of science and business courses The BS in Textile Chemistry and the BS in Textile Science are both based on the three sciences chemistry, physics, and mathematics With this firm base, the graduate is able to apply scientific knowledge to the solution of problems involving both chemical and physical principles The graduate will be concerned with the conception, design, construction, and management of complete systems of labor, machinery and processes for the most efficient production of textiles or related chemicals These two courses differ in that Textile Chemistry has a greater emphasis on chemistry and Textile Science has greater emphasis on yarn and fabric formation. Both curricula prepare one for graduate study in textiles.

The Bachelor of Science in Textile Management provides the student with a balanced combination of the principles and theories of textile manufacturing and management, as well as concentrated studies in related options of the student's choice. This program is designed to prepare students for a career in the modern industrial environment and may initially lead to a production management position in the textile industry.

Today's textile graduate must be able to meet the current and anticipated needs of the rapidly changing modern textile industry and also be knowledgeable about the suppliers and users of textile-related materials and equipment. This plan of study maximizes students' leadership potential and professional development in their chosen field.

The School of Textiles also offers advanced degrees as follows: Master of Science in Textile Chemistry, Master of Science in Textile Science, Doctor of Philosophy in Textile and Polymer Science, and in cooperation with the Chemistry Department, the Doctor of Philosophy in Chemistry with a major in Textile Chemistry.

Textile courses also may be taken as a minor area or as free electives. Recommended groups of courses may consist of 3, 6, 12, or 20 credits.

TEXTILE CHEMISTRY

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
TEXT 175 Intro. to Textile Manufacturing	3	PHYS 122 Phys. with Cal. I	3
History Requirement[1]	3	Elective	3
	17		17

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 225 Organic Chemistry Lab.	2	CH 226 Organic Chemistry Lab.	2
MTHSC 206 Calculus of Sev. Var.	4	MTHSC 208 Intro. to Ord. Diff. Equa.	4
PHYS 221 Phys. with Cal. II	3	PHYS 222 Phys. with Cal. III	3
PHYS 223 Physics Lab. II	1	PHYS 224 Physics Lab. III	1
Literature Requirement[2]	3	Humanities Requirement[3]	3
	16		16

JUNIOR YEAR

CH 331 Physical Chemistry	3	CH 332 Physical Chemistry	3
ECON 200 Economic Concepts	3	ENGL 314 Technical Writing	3
TC 315 Intro. to Polymer Science and Engineering	3	TC 316 Chem. Prep. of Text.	3
TC 317 Polymer and Fiber Lab.	1	TEXT 202 Fabric Structure, Design, and Analysis	4
TEXT 201 Yarn Structure and Form.	4	Elective	4
Elective	3		
	17		17

SENIOR YEAR

TC 457 Dyeing and Finishing I	3	TC 458 Dyeing and Finishing II	3
TC 459 Dyeing and Finishing Lab I	1	TC 460 Dyeing and Finishing Lab II	1
TEXT 321 Fiber Science	3	TEXT 322 Prop of Textile Structures	3
Elective	9	Elective	9
	16		16

132 Total Semester Hours

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[1] Select from HIST 101 102 172 173
[2] Select from ENGL 202 203 204 205 206 207 208 209
[3] See page 53

TEXTILE MANAGEMENT

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	CPSC 110 Elem Comp Prog	3
MTHSC 102 Intro to Math Analysis	3	or CPSC 120 Intro to Info Processing Systems	3
TEXT 175 Intro to Textile Mfg	3	ENGL 102 Composition II	3
History Requirement[1]	3	MTHSC 207 Multivariable Calculus	3
	16	TEXT 176 Natural and Manmade Fibers	4
			17

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[1] HIST 101 102 172 173

CHEMICAL OPTION

SOPHOMORE YEAR

ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
PSYCH 201 Introduction to Psychology	3	MGT 301 Principles of Management	3
TEXT 201 Yarn Structures and Form	4	TEXT 202 Fabric Structure, Design, and Analysis	4
TEXT 324 Textile Statistics	3	Literature Requirement[2]	3
Textile Option[1]	4	Textile Option[1]	4
	17		17

JUNIOR YEAR

ECON 211 Principles of Economics	3	ECON 212 Principles of Economics	3
FIN 306 Corporation Finance	3	ENGL 314 Technical Writing	3
LAW 322 Legal Envir of Business	3	MGT 307 Personnel Management	3
MKT 301 Principles of Marketing	3	Area Concentration[3]	3
Area Concentration[3]	3	Textile Option[1]	4
	15		16

SENIOR YEAR

TEXT 470 Textile Costing and Inventory Control	3	MGT 415 Business Strategy	3
Area Concentration[3]	3	Area Concentration[3]	3
Humanities Requirement[4]	3	Textile Option[1]	3
Textile Option[1]	6	Elective	7
Elective	3		16
	18		

132 Total Semester Hours

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[1] Textile Option to be selected from the following TC 303 304 305 306 316 405 457 459 TEXT 322 416 428 429
[2] Select from ENGL 202 203 204 205 206 207 208 209
[3] Area Concentrations A minimum of 9 credits must be selected from one of the following area concentrations

Personnel ECON 301 308 LAW 312 313 401, MGT 400 416

Markets and Marketing ECON 314, 412, MKT 402, 423, 424, 426, 431, 450, TEXT 472

Safety and Health SH 306, 307, 401, 402, 404

Industrial Engineering EG 109, IE 306, MGT 402, 408

Science TC 303/305, 304/306, MTHSC 106, 108, 206, 208, PHYS 122, 221, 222, 223, 224

Computer Science CPSC 130, 210, 230, 240, 330, 360, 462, E&CE 425, MGT 299, 399, MTHSC 219, TEXT 203, 420.

[4] See page 53

MANUFACTURING OPTION

See page 97 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
ACCT 201 Principles of Accounting	3	ACCT 202 Principles of Accounting	3
ECON 211 Principles of Economics	3	ECON 212 Principles of Economics	3
PSYCH 201 Introduction to Psychology	3	MGT 301 Principles of Management	3
TEXT 201 Yarn Structure and Form	4	TEXT 202 Fabric Structures, Design, and Analysis	4
TEXT 324 Textile Statistics	3	Literature Requirement[1]	3
	16		16

JUNIOR YEAR

FIN 306 Corporation Finance	3	ENGL 314 Technical Writing	3
LAW 322 Legal Environ. of Business	3	MGT 307 Personnel Management	3
MKT 301 Principles of Marketing	3	Area Concentration[2]	3
TEXT 308 Apparel	4	Textile Option[3]	5
Area Concentration[2]	3	Elective	3
	16		17

SENIOR YEAR

TEXT 470 Textile Costing and Inventory Control	3	MGT 415 Business Stategy	3
Area Concentration[2]	3	Area Concentration[2]	3
Humanities Requirement[4]	3	Textile Option[3]	6
Textile Option[3]	6	Elective	4
Elective	3		16
	18		

132 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Area Concentrations A minimum of 9 credits must be selected from one of the following area concentrations:

Personnel ECON 301, 308, LAW 312, 313, 401, MGT 400, 416

Markets and Marketing ECON 314, 412, MKT 402, 423, 424, 426, 431, 450, TEXT 472

Safety and Health SH 306, 307, 401, 402, 404

Industrial Engineering EG 109, IE 306, MGT 402, 408

Science TC 303/305, 304/306, MTHSC 106, 108, 206, 208, PHYS 122, 221, 222, 223, 224, TEXT 203, 420.

Computer Science CPSC 130, 210, 230, 240, 330, 360, 462, E&CE 425, MGT 299, 399, MTHSC 219.

[3] Textile Option to be selected from the following. TEXT 314, 322, 403, 411, 416, 426, 428, 429, 471.

[4] See Page 53.

TEXTILE SCIENCE

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
TEXT 175 Intro. to Textile Mfg.	3	PHYS 122 Physics with Cal. I	3
History Requirement[1]	3	Elective	3
	17		17

SOPHOMORE YEAR

MTHSC 206 Cal of Several Var	4	ECON 200 Economic Concepts	3
PHYS 221 Phys with Cal II	3	MTHSC 208 Intro to Ord Diff Equa	4
PHYS 223 Physics Lab II	1	PHYS 222 Phys with Cal III	3
TEXT 301 Fiber Processing I	3	PHYS 224 Physics Lab III	1
Literature Requirement[2]	3	TEXT 302 Fiber Processing II	3
Elective	1	Elective	3
	15		17

JUNIOR YEAR

TC 303 Textile Chemistry	3	ENGL 314 Technical Writing	3
TC 305 Textile Chemistry Lab	1	TC 304 Textile Chemistry	3
TEXT 311 Fabric Development I	3	TC 306 Textile Chemistry Lab	1
TEXT 321 Fiber Science	3	TEXT 312 Fabric Development II	3
Humanities Requirement[3]	3	TEXT 322 Properties of Textile Structures	3
Elective[4]	5	Elective	3
	18		16

SENIOR YEAR

TC 315 Introduction to Polymer Science and Engineering	3	TC 457 Dyeing and Finishing I	3
TC 317 Polymer and Fiber Lab	1	TC 459 Dyeing and Fin Lab I	1
TEXT 403 Fiber Processing III	3	TEXT 414 Nonwoven and Knitted Structures	3
TEXT 411 Fabric Development III	3	Elective[4]	9
Elective[4]	6		16
	16		

132 Total Semester Hours

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[1] Select from HIST 101, 102, 172, 173

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] See page 53

[4] See adviser for list of approved electives

COLLEGE OF EDUCATION

The purpose of the College of Education is to prepare teachers, special services personnel, and school leaders; to provide professional services to education in South Carolina; and to carry out basic and applied research in education. Curricula are organized to give students the opportunities to (1) acquire a broad general education through liberal arts and science courses; (2) develop depth of knowledge in the teaching area; (3) gain an understanding of the historical, philosophical and psychological backgrounds of American education; and (4) acquire knowledge of and skill and experience in using effective teaching techniques.

Curricula for those preparing to teach have been especially designed by committees from each department offering a teaching major and the College of Education.

ADMISSION

Admission to teacher education programs in the College of Education is accomplished in three phases: preprofessional, professional, and directed teaching.

Preprofessional Individuals who show an interest in teaching and related areas and who have met the general admission requirements of Clemson University must complete and submit a College of Education application form to be considered for admission to a preprofessional program. These forms are available in all Education departments.

Professional During the term in which a student is to complete 60 semester hours of work, he/she must have a minimum cumulative grade-point ratio of 1.8, successfully complete the Basic Skills Education Entrance Examination (EEE), and apply on the College of Education form for admission to a professional program. For undergraduate students who enter Clemson after May 15, 1986, the minimum grade-point ratio is 2.5 or a cumulative grade-point ratio of 2.0 and evidence of a score above the 50th percentile of examinees in South Carolina taking the SAT in the year of graduation from high school. The professional education admission application is to be submitted to the department head by November 10, March 1, or at the beginning of the summer term in which the student will have completed 60 semester hours. A student who has not passed the EEE may be conditionally admitted to a teacher education program for a period not to exceed one year. Students will be allowed to take the examination no more than three times. Students who fail to meet the EEE requirement within one year of the date of conditional admission will be dropped from the program.

Directed Teaching A student who is in a professional program and who has completed at least 95 semester hours is eligible to register for the appropriate directed teaching program. A student should apply to the head of his/her department prior to May 1 of the academic year preceding the school year in which directed teaching is to be scheduled. The cumulative grade-point average necessary for graduation is required prior to being permitted to register for directed teaching and the related methods courses.

A student must arrange for his/her National Teacher Examination score report to be furnished to the College of Education prior to registering for directed teaching. A score report must be received for each examination required by the South Carolina State Board of Education (National Teachers Examination/South Carolina Teaching Area Examination and South Carolina Professional Knowledge Examination).

CONTINUING ENROLLMENT

A student must maintain the grade-point average for admission to the program and that required by Clemson University for continuing enrollment. Grade-point ratio may be checked at the end of a semester or summer term. A student must have a cumulative grade-point ratio of 1.8 to enroll in 300-level and 2.0 to enroll in 400-level education courses. For undergraduate students who enter Clemson after May 15, 1986, a cumulative grade-point ratio of 2.0 or higher is required for registration in all teacher education courses numbered 300 or higher.

Any student who desires to enroll in education courses must meet the cumulative grade-point requirements established for Education majors.

A student who is denied admission may appeal to the College of Education Admissions Committee.

A comprehensive statement of the activities, services, and programs of the College of Education is published in the Student Handbook, which is distributed by faculty advisers to Education majors and students interested in education.

GRADUATE STUDY

The College of Education offers programs leading to the Master of Education, Master of Industrial Education, Specialist in Education, and Doctor of Education degrees.

BACHELOR OF ARTS CURRICULA

EARLY CHILDHOOD EDUCATION AND ELEMENTARY EDUCATION PROGRAMS

The Early Childhood Education curriculum prepares the student for teaching positions in kindergarten and grades one through four. The Elementary Education curriculum prepares the student for teaching on the elementary school level. Both Early Childhood and Elementary Education majors may become eligible for certification in South Carolina as Special Education teachers by taking courses required by the State Department of Education. (See adviser.)

EARLY CHILDHOOD EDUCATION

FRESHMAN YEAR

First Semester		**Second Semester**	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	HIST 172 Western Civilization	3
MTHSC 115 Contemporary Math for the Elem School Teacher I	3	MTHSC 116 Contemporary Math for the Elem School Teacher II	3
Foreign Language[5]	4	Foreign Language[5]	4
Science[2]	4	Science[2]	4
	15		17

SOPHOMORE YEAR

HIST 173 Western Civilization	3	ED 301 Principles of American Ed	3
MTHSC 216 Geometry for Elementary School Teachers	3	ED 334 Child Growth and Dev	3
Foreign Language[5]	3	ENGL 301 Public Speaking	3
Literature Requirement[1]	3	MUS 210 Music Appreciation	3
Science[2]	4	Foreign Language[5]	3
Social Science Elective[3]	3	Literature Requirement[2]	3
	19		18

JUNIOR YEAR

CAAH 303 or 304 Evol of Vis Arts	3	ED 483 Methods and Materials for Early Childhood Education	3
ED 302 Educational Psychology	3	ED 488 Teaching the Language Arts in the Elementary School	3
ED 321 Phys Ed for Elem School	3	INED 372 Arts and Crafts	3
ED 336 Behavior of the Preschool Child	3	Social Science Elective[3]	3
ED 461 Teaching Reading in the Elementary School	3	Elective	4
ED 466 Intro to Early Child Ed	3		
	18		16

SENIOR YEAR

(Block Schedule—Either Semester)

ED 458 Health Education	3	ED 462 Diagnostic and Corrective Reading	3
ED 471 The Exceptional Child	3	ED 484 Directed Teaching in Early Childhood Education[4]	12
ENGL 385 Children's Literature	3		
MUS 400 Music in the Elementary School Classroom	3		
Elective	6		
	18		15

136 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] A total of 12 semester hours composed of both biological and physical sciences, including appropriate laboratories, is required. Eight credits must be in a two-semester sequence

[3] Anthropology, economics, geography, philosophy, political science, psychology, religion, and sociology

[4] Block schedule must be taken as shown in either semester of the senior year

[5] Two years of the same language are required

ELEMENTARY EDUCATION

FRESHMAN YEAR

First Semester		**Second Semester**	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	HIST 172 Western Civilization	3
MTHSC 115 Contemporary Math. for Elem. School Teachers I	3	MTHSC 116 Contemporary Math for Elem School Teachers II	3
Foreign Language[5]	4	Foreign Language[5]	4
Science[2]	4	Science[2]	4
	15		17

SOPHOMORE YEAR

HIST 173 Western Civilization	3	ED 301 Principles of American Ed	3
MTHSC 216 Geometry for Elementary School Teachers	3	ED 334 Child Growth and Dev	3
Foreign Language[5]	3	MUS 210 or 311 Music Appreciation	3
Literature Requirement[1]	3	Foreign Language[5]	3
Science[2]	4	Literature Requirement[1]	3
		Social Science Requirement[3]	3
	16		18

JUNIOR YEAR

CAAH 303 or 304 Evol. of Vis. Arts	3	ED 461 Teaching Reading in the Elementary School	3
ED 302 Educational Psychology	3	ED 485 Meth. and Curriculum in Elem. Math. and Science	3
ED 471 The Exceptional Child	3	ED 487 Teaching Social Studies in the Elementary School	2
ENGL 301 Public Speaking	3	ED 488 Teaching Language Arts in the Elementary School	3
ENGL 385 Children's Literature	3	Elective	6
INED 372 Arts and Crafts	3		
	18		17

SENIOR YEAR

(Block Schedule—Either Semester)

ED 321 Phys. Ed. for Elem. School	3	ED 462 Diagnostic and Corrective Reading	3
ED 458 Health Education	3	ED 481 Directed Teaching[4]	12
MUS 400 Music in the Elementary School Classroom	3		15
Social Science Requirement[3]	3		
Elective	6		
	18		

134 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2] A total of 12 semester hours composed of both biological and physical sciences, including appropriate laboratories, is required. Eight of these hours must be in a two-semester sequence.

[3] Anthropology, economics, geography, philosophy, political science, psychology, religion, and sociology.

[4] Block schedule must be taken as shown in either semester of the senior year.

[5] Two years of the same language are required.

SECONDARY EDUCATION CURRICULA

Programs leading to a Bachelor of Arts degree in Secondary Education are available to students preparing to teach English, history, mathematical sciences, French, German, Spanish, natural sciences, political science, and social science, on the secondary school level. The teaching field should be selected as early as possible in order that appropriate freshman and sophomore courses may be taken.

Each curriculum requires a major concentration in the teaching field. Specific courses and sequences have been designated by teacher education committees to meet requirements for those planning to teach. Students who have elective courses in the teaching area should consult the departmental adviser prior to scheduling these courses.

The professional education courses should be completed in sequence prior to registering for the block schedule. Application to Directed Teaching (ED 412) should be made in writing no later than May 1 preceding the school year in which student teaching is to be scheduled. A student whose cumulative grade-point is lower than the requirement for graduation will not be permitted to register for Directed Teaching.

Education 412 is conducted on a full-day basis, "block schedule," for one semester. Students taking ED 412 will register for ED 498, this course being taught on a five-day basis during the first portion of the semester

TEACHING AREA: ENGLISH

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	HIST 172 Western Civilization	3
MTHSC 101 Finite Probability	3	MTHSC 102 Intro to Math Analysis	3
Foreign Language[1]	4	Foreign Language[1]	4
Science[2]	4	Science[2]	4
Elective	1	Elective	1
	16		18

SOPHOMORE YEAR

ED 301 Principles of Amer Ed	3	ED 302 Educational Psychology	3
ENGL 202 Major Forms of Literature	3	ENGL 209 Contemporary Literature	3
HIST 173 Western Civilization	3	ENGL 353 Ethnic American Literature	3
Foreign Language[1]	3	Foreign Language[1]	3
Science[2]	4	Social Science Requirement[3]	3
	16	Elective	2
			17

JUNIOR YEAR

ED 335 Adol. Growth and Development	3	ED 424 Methods and Materials in Secondary English[5]	3
HIST 361 or 363 History of England	3	MUS 210 or 311 Music Appreciation	3
Teaching Major[4]	9	Social Science Requirement[3]	3
Elective	3	Teaching Major[4]	9
	18		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol. of Vis Arts I	3	ED 412 Directed Teaching	12
ED 458 Health Education	3	ED 498 Secondary Content Area Reading	3
ED 471 The Exceptional Child	3		15
Teaching Major[4]	6		
Elective	3		
	18		

136 Total Semester Hours

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[1] Two semesters of the same language are required

[2] A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence

[3] See adviser

[4] In addition to ENGL 202, 209, and 353, the Teaching Major requires 24 semester hours of junior and senior English courses and must include ENGL 386, 400, 401, 405 or 406, 411, 422 or 423, 435 and 485.

[5] To be taken in the semester preceding student teaching

TEACHING AREA: HISTORY

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	HIST 172 Western Civilization	3
MTHSC 101 Finite Probability	3	MTHSC 102 Intro. to Math. Analysis	3
Foreign Language[1]	4	Foreign Language[1]	4
Science[2]	4	Science[2]	4
Elective	2		17
	17		

SOPHOMORE YEAR

HIST 173 Western Civilization	3	ED 301 Principles of American Ed.	3
Foreign Language[1]	3	GEOG 101 Intro. to Geography	3
Literature Requirement[3]	3	HIST 101 History of the U.S.	3
Science[2]	4	POSC 101 Amer. Nat'l. Govt.	3
Elective	3	Foreign Language[1]	3
	16	Elective	3
			18

JUNIOR YEAR

ED 302 Educational Psychology	3	ED 428 Methods and Materials in Secondary School Sciences[6]	3
ED 335 Adol Growth and Dev	3	Composition or Speech[4]	3
HIST 102 History of the U S	3	Teaching Major[5]	9
Teaching Major[5]	6	Elective	2
Elective	3		
	18		17

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol of Vis Arts	3	ED 412 Directed Teaching	12
ECON 200 Economic Concepts	3	ED 471 The Exceptional Child	3
ED 458 Health Education	3	ED 498 Secondary Content Area Reading	3
MUS 210 or 311 Music Appreciation	3		18
Teaching Major[5]	6		
	18		

139 Total Semester Hours

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[1] Two years of the same language are required

[2] A total of 12 credits composed of both physical and biological sciences including appropriate laboratories is required Eight of the credits must be in a two-semester sequence

[3] Select from ENGL 202 203 204 205 206 207 208 209

[4] Select from ENGL 231 301, 312 314

[5] The Teaching Major requires HIST 313 and 21 hours of junior and senior-level (300 and 400) course 6 hours at the 400 level Courses must be selected with the consent of the major adviser and include at least 3 hours in each of the following categories U S History, European History, Third World or non-European History

[6] To be taken the semester preceding Directed Teaching

Note This program enables the student to meet the requirements for certification in South Carolina in the field of history If certification in social sciences is desired, the student must select one three-hour course in geography or political science

TEACHING AREA: MATHEMATICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 108 Cal of One Var II	4
MTHSC 106 Cal of One Var I	4	Foreign Language[1]	4
Foreign Language[1]	4	Elective	3
	16		18

SOPHOMORE YEAR

ED 302 Educational Psychology	3	CPSC 110 Elem Comp Prog	3
MTHSC 206 Calculus of Sev Var	4	ED 335 Adol Growth and Dev	3
Foreign Language[1]	3	HIST 173 Western Civilization	3
Literature Requirement[2]	3	Foreign Language[1]	3
Science Requirement[3]	3	Science Requirement[3]	3
Elective	1	Social Science Requirement[5]	3
	17		18

JUNIOR YEAR

ED 301 Principles of American Ed	3	CAAH 303 or 304 Evol of Vis Arts	3
HIST 172 Western Civilization	3	ED 426 Methods and Materials in Secondary Mathematics[6]	3
MTHSC 301 Stat Theory and Meth I	3	MTHSC 311 Linear Algebra	3
MTHSC 308 College Geometry	3	MTHSC 408 Topics in Geometry	3
Social Science Requirement[5]	3	Composition and Speech[4]	3
Elective	3	Elective	3
	18		18

SENIOR YEAR

(Block Schedule—Either Semester)

ED 458 Health Education	3	ED 412 Directed Teaching	12
ED 471 The Exceptional Child	3	ED 498 Secondary Content Area Reading	3
MTHSC 412 Intro. to Mod. Algebra	3		
MTHSC 453 Advanced Calculus I	3		
MUS 210 or 311 Music Appreciation	3		
Mathematics Requirement[7]	3		
	18		15

138 Total Semester Hours

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[1] Two years of the same language are required
[2] Select from ENGL 202, 203, 204, 205, 206, 207 208, 209
[3] Select from astronomy chemistry, geology, physics
[4] Select from ENGL 231, 301, 312, 314
[5] Economics, geography, philosophy, political science, psychology, religion, sociology
[6] To be taken in the semester preceding Directed Teaching
[7] Select from CPSC 130, MTHSC 400, 403, 405, 440, 454

TEACHING AREA: MODERN LANGUAGES (French, German and Spanish)

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 English Composition II	3
ENGL 101 English Composition I	3	HIST 172 Western Civilization	3
Foreign Language[1]	4	MTHSC 102 Intro. to Math. Analysis	3
MTHSC 101 Finite Probability	3	Foreign Language[1]	4
Science[2]	4	Science[2]	4
	15		17

SOPHOMORE YEAR

ED 301 Principles of American Ed.	3	ED 302 Educational Psychology	3
HIST 173 Western Civilization	3	Foreign Language[1]	3
Foreign Language[1]	3	Literature Requirement[3]	3
Literature Requirement[3]	3	Social Science Requirement[5]	3
Science[2]	4	Elective	6
	16		18

JUNIOR YEAR

ED 335 Adol. Growth and Dev	3	ED 425 Methods and Materials in Language[6]	3
Teaching Major[7]	9	ED 471 The Exceptional Child	3
Social Science Requirement[5]	3	Composition and Speech[4]	3
Elective	3	Teaching Major[7]	9
	18		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol. of Vis. Arts	3	ED 412 Directed Teaching	12
ED 458 Health Education	3	ED 498 Seondary Content Area Reading	3
MUS 210 or 311 Music Apprec.	3		
Teaching Major[7]	6		
Elective	3		
	18		15

135 Total Semester Hours

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[1] Two years of the same language are required.
[2] A total of 12 semester hours, composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the credits must be in a two-semester sequence.
[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[4] Select from ENGL 231, 301, 312, 314.

[5] Economics philosophy political science psychology religion sociology geography anthropology
[6] To be taken in the semester preceding Directed Teaching
[7] The teaching major requires 24 semester hours in either French German or Spanish as follows
French major must include FR 205 and 21 hours arranged as follows
  Group I 15 semester hours credit from FR 209 301 or 302 305 307 and 409 or 411
  Group II 6 semester hours credit from FR 403 or 404 and 405 or 406
German major must include GER 205 and 21 semester hours arranged as follows
  Group I 15 semester hours credit GER 301 302 305 307 412
  Group II 6 semester hours from GER 401 or 402 or 403 and 411 or 413
Spanish major must include SPAN 205 and 21 hours arranged as follows
  Group I 6 semester credit hours from SPAN 303 or 304 and 311 (preferably in sequence)
  Group II 9 semester credit hours from SPAN 305 307 308
  Group III 6 semester credit hours from SPAN 401 or 402 and 409

TEACHING AREA: NATURAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 102 Intro to Math Analysis	3
MTHSC 101 Finite Probability	3	Foreign Language[1]	4
Foreign Language[1]	4	Elective	4
Elective	1		18
	16		

SOPHOMORE YEAR

BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
ED 302 Educational Psychology	3	ED 335 Adol Growth and Dev	3
MTHSC 203 Elem Stat Inference	3	HIST 172 Western Civilization	3
Foreign Language[1]	3	Foreign Language[1]	3
Literature Requirement[2]	3	Social Science Requirement[6]	3
Elective	2	Elective	1
	18		17

JUNIOR YEAR

ED 301 Principles of American Ed	3	ED 427 Meth and Mat in Sec Sciences[5]	3
GEOL 101 Physical Geology	4	GEOL 102 Historical Geology	4
HIST 173 Western Civilization	3	PHYS 208 General Physics II	4
PHYS 207 General Physics I	4	Composition and Speech[3]	3
Science Requirement[4]	3	Elective	3
	17		17

SENIOR YEAR

(Block Schedule—Either Semester)

ASTR 102 Stellar Astronomy	3	ED 412 Directed Teaching	12
CAAH 303 or 304 Evol of Vis Arts I	3	ED 498 Secondary Content Area Reading	3
ED 458 Health Education	3		15
ED 471 The Exceptional Child	3		
MUS 210 or 311 Music Apprec	3		
Social Science Requirement[6]	3		
	18		

136 Total Semester Hours

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[1] Two years of the same language are required
[2] Select from ENGL 202 203 204 205, 206 207 208, 209
[3] Select from ENGL 231 301 312, 314
[4] Select from biological sciences, chemistry, geology, physics
[5] To be taken in the semester preceding Directed Teaching
[6] Economics, geography philosophy political science psychology religion sociology

TEACHING AREA: POLITICAL SCIENCE

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 English Composition II	3
ENGL 101 English Composition I	3	HIST 173 Western Civilization	3
HIST 172 Western Civilization	3	MTHSC 102 Intro. to Math. Analysis	3
MTHSC 101 Finite Probability	3	Foreign Language[1]	4
Foreign Language[1]	4	Science[2]	4
Science[2]	4		17
	18		

SOPHOMORE YEAR

HIST 101 History of the U S	3	ED 301 Principles of Amer. Ed	3
POSC 101 Amer Nat Govt	3	HIST 102 History of the U S	3
Foreign Language[1]	3	POSC 201 Intro to Pol Sci.	3
Literature Requirement[3]	3	Foreign Language[1]	3
Science[2]	4	Elective	6
	16		18

JUNIOR YEAR

ED 302 Educational Psychology	3	ED 428 Methods and Materials in Secondary Social Science[6]	3
ED 335 Adol Growth and Development	3	Composition or Speech[4]	3
Teaching Major[5]	6	Teaching Major[5]	9
Elective	4	Elective	3
	16		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol of Vis Arts	3	ED 412 Directed Teaching	12
ECON 200 Economics Concepts	3	ED 471 The Exceptional Child	3
ED 458 Health Education	3	ED 498 Secondary Content Area Reading	3
MUS 210 or 311 Music Appreciation	3		18
Teaching Major[5]	6		
	18		

139 Total Semester Hours

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[1] Two years of the same language are required

[2] A total of 12 semester hours composed of both physical and biological science including appropriate laboratories, is required Eight of the semester hours must be in a two-semester sequence

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] Select from ENGL 231, 301, 312, 314

[5] The teaching major requires POSC 302 and 21 credits of junior- and senior-level political science courses The credits are to be drawn from four of the following fields

American Governments—POSC 403, 405, 409
Comparative Governments—POSC 371, 372, 475, 476
International Relations—POSC 361, 462, 463, 465
Political Behavior—POSC 341, 442, 443, 454
Political Thought—POSC 351, 352, 453, 482
Public Administration—POSC 422, 423, 424, 425, 427, 428
Public Law—POSC 432, 433, 434, 435

[6] To be taken in the semester preceding Directed Teaching

Note: This program enables the student to meet the requirements for certification in South Carolina in the field of political science If certification in social studies is desired, the student must take a three-hour course in either geography or sociology.

TEACHING AREA: SOCIAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	HIST 173 Western Civilization	3
HIST 172 Western Civilization	3	MTHSC 102 Intro. to Math. Analysis	3
MTHSC 101 Finite Probability	3	Foreign Language[1]	4
Foreign Language[1]	4	Science Requirement[2]	4
Science Requirement[2]	4		17
	18		

SOPHOMORE YEAR

HIST 101 History of the U.S.	3	GEOG 101 Intro. to Geography	3
PSYCH 201 Intro. to Psychology	3	HIST 102 History of the U.S.	3
Foreign Language[1]	3	POSC 101 American National Gov't	3
Literature Requirement[3]	3	SOC 201 Introduction to Sociology	3
Science Requirement[2]	4	Foreign Language[1]	3
Elective	2	Elective	2
	18		17

JUNIOR YEAR

ED 301 Principles of American Ed.	3	ED 428 Methods and Materials in Secondary Social Sciences[6]	3
ED 302 Educational Psychology	3	Composition or Speech[4]	3
ED 335 Adol. Growth and Development	3	Teaching Major[5]	9
Teaching Major[5]	9	Elective	3
	18		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol. of Vis. Arts	3	ED 412 Directed Teaching	12
ED 458 Health Education	3	ED 471 The Exceptional Child	3
MUS 210 or 311 Music Appreciation	3	ED 498 Secondary Content Area Reading	3
Teaching Major[5]	6		18
Elective	3		
	18		

142 Total Semester Hours

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[1] Two years of the same language are required.

[2] A total of 12 semester hours composed of both physical and biological sciences, including appropriate laboratories, is required. Eight of the semester hours must be in a two-semester sequence.

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, and 209.

[4] Select from ENGL 231, 301, 312, 314.

[5] The Teaching Major consists of ECON 211/212 and 18 semeter hours of junior and senior (300 and 400) level courses selected from sociology and psychology with no fewer than 6 hours in each. Courses to be chosen from the following: PSYCH 320, 330, 333, 340, 352, 370, 415; SOC 311, 383, 392, 395, 460, 461.

[6] To be taken in the semester preceding Directed Teaching.

BACHELOR OF SCIENCE CURRICULA

AGRICULTURAL EDUCATION

The College of Education and the College of Agricultural Sciences conduct a cooperative program to produce agricultural teachers for South Carolina. (See the Agricultural Education curriculum under the College of Agricultural Sciences.)

GRAPHIC COMMUNICATIONS

The Bachelor of Science degree in Graphic Communications is designed to prepare students for professional careers in printing, publishing, packaging, and related industries. The core curriculum assures the graduate of having the skills and knowledge required by most entry-level jobs. The approved electives provide each student the opportunity to select courses which enhance career preparation in specific segments of graphic communications. The nature of the coursework is heavily oriented around individual laboratory performance which stresses the development of problem-solving skills in a broad cross section of manufacturing areas. Applications include all major processes and a variety of industry segments, including commercial printing, publishing, package production, specialty printing, and industrial applications of printing technology beyond communications. The most common career opportunities are in printing management, production planning and supervision, and both commercial and technical sales.

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3	CPSC 110 Elem Computer Prog	3
GC 101 Orientation to Graphic Comm.	1	or CPSC 120 Intro to Information Processing Systems	3
INED 106 Drafting for Industrial Ed I	3	ECON 200 Economic Concepts	3
Approved Lab Science Requirement[2]	4	or ECON 211 Prin. of Economics	3
Mathematics Requirement[1]	3	ENGL 102 English Composition II	3
Elective	3	GC 104 Graphic Arts I	3
		Mathematics Requirement[1]	3
		Elective	2
	17		17

SOPHOMORE YEAR

ACCT 203 Financial Accounting[5]	3	ACCT 307 Managerial Accounting	3
GC 207 Graphic Arts II	3	GC 304 Photographic Techniques	3
INED 105 Machining Practice	3	MGT 399 Mgt Application of Microcomputers	2
MGT 299 Computer Utilization I	1	PSYCH 201 Introduction to Psychology	3
MGT 301 Principles of Management	3	Approved Laboratory Science Requirement[2]	4
Approved Lab Science Requirement[2]	4	Elective	1
	17		16

GC 350 Internship I[4] 1

JUNIOR YEAR

GC 440 Adv Lithographic Methods	4	ENGL 301 Public Speaking	3
INED 208 Electricity	3	GC 406 Problems in Specialty Printing	4
INED 325 Ind Org. and People	3	MGT 307 Personnel Management	3
PSYCH 364 Industrial Psychology	3	MKT 301 Principles of Marketing	3
Literature Requirement[3]	3	Humanities Requirement	3
	16		16

GC 450 Internship II[4] 1

SENIOR YEAR

ENGL 314 Technical Writing	3	GC 448 Planning and Controlling Printing Functions	3
GC 444 Current Developments and Trends in Graphic Communications	3	INED 496 Public Relations	3
Approved Elective[1]	8	Approved Elective[1]	8
Elective	3	Elective	3
	17		17

135 Total Semester Hours

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[1] Approved electives and Mathematics Requirements must be approved by adviser

[2] Approved Laboratory Science Requirement must include a two-semester sequence from chemistry or physics.

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] Student is required to complete at least two work periods of ten or more weeks full time

[5] ACCT 201 or 202 may be taken in lieu of ACCT 203.

INDUSTRIAL EDUCATION

The Bachelor of Science degree in Industrial Education is designed to prepare students for professional teaching positions, as well as occupations within the framework of human resource development/industrial training in the private sector. To accomplish these purposes the curriculum is divided into the three areas of specialization. By the end of the freshman year, each student is required to select one of three options: Education for Industry, Industrial Technology Education, or Vocational-Technical Education. Each option requires 135 semester hours of coursework.

EDUCATION FOR INDUSTRY OPTION

The Education for Industry Option is designed to prepare students to enter industry or business as training and development specialists. The curriculum provides participants with a broad exposure to industrial processes in the areas of manufacturing, construction, transportation, and communications. Numerous hands-on experiences related to the application of technology in industry are integrated with valuable skills and knowledge from the training and development profession. Students will exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3	ENGL 102 Composition II	3
INED 101 Intro. to Ind. Ed	1	GC 104 Graphic Arts I	3
INED 102 Woodworking I	2	INED 108 Training Prog. in Ind. I	3
INED 105 Machining Practices	3	Mathematics Requirement[1]	3
INED 106 Drafting for Ind. Ed. I	3	Science Requirement[1]	4
Mathematics Requirement[1]	3	Elective	1
Elective	1		17
	16		

SOPHOMORE YEAR

INED 203 Basic Metal Proc.	3	ACCT 203 Financial Accounting	3
INED 205 Power Technology	3	ECON 211 Principles of Economics	3
SOC 201 Introduction to Sociology	3	INED 208 Electricity	3
Literature Requirement[2]	3	PSYCH 201 Introduction to Psychology	3
Science Requirement[1]	4	Humanities Requirement	3
Elective	1	Elective	1
	17		16

JUNIOR YEAR

ECON 301 Economics of Labor	3	ENGL 301 Public Speaking	3
INED 325 Ind. Org. and People	3	INED 316 Plastics and Plastic Proc.	3
MGT 301 Principle of Management	3	MGT 307 Personnel Management	3
TEXT 460 Textile Processes	3	PSYCH 364 Industrial Psychology	3
Computer Applications[3]	3	Approved Elective[4]	3
Approved Elective[4]	3	Elective	2
	18		17

SENIOR YEAR

INED 404 Org of Ind Training Mat	3	INED 408 Training Prog in Ind. II	3
INED 418 Tech. Concepts in Mfg	3	INED 415 Construction Practices	3
INED 422 Hist. and Phil of Ind and Voc Education	3	INED 465 Motion Picture Production	3
SOC 330 Industrial Sociology	3	INED 496 Public Relations	3
Approved Elective[4]	3	Approved Elective[4]	3
Elective	2	Elective	2
	17		17

135 Total Semester Hours

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[1] See page 52

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] To be selected from CPSC 110, 120, 150, 152, 156

[4] Approved electives to be approved by adviser, two technical courses must be represented

Note One summer (400 clockhours) of field experience is required of each student following the sophomore year

INDUSTRIAL TECHNOLOGY EDUCATION OPTION

The Industrial Technology Education option is for students who desire to teach industrial technology in the secondary schools. Industrial technology is the subject area in the public school system which attempts to provide youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this option are qualified to seek certification as secondary school teachers of industrial technology, prevocational, and industrial arts education.

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	INED 103 Woodworking II	2
INED 101 Intro. to Ind. Ed.	1	INED 105 Machining Practices	3
INED 102 Woodworking I	2	INED 107 Drafting for Ind. Ed. II	3
INED 106 Drafting for Ind. Ed. I	3	Mathematics Requirement	3
Mathematics Requirement	3	Science Requirement[1]	4
Science Requirement[1]	4		18
	17		

SOPHOMORE YEAR

HIST 191 World in the 20th Century	3	GC 104 Graphic Arts I	3
INED 203 Basic Metal Processes	3	INED 208 Electricity	3
INED 205 Power Technology	3	INED 313 Arts and Crafts	3
Literature Requirement[2]	3	MUS 210 or 311 Music Appreciation	3
Science Requirement[1]	4	Social Science Requirement[3]	3
Elective	1	Elective	2
	17		17

JUNIOR YEAR

ED 302 Educational Psychology	3	ED 335 Adol. Growth and Dev.	3
INED 302 Dwelling Materials and Construction Methods	2	ED 458 Health Education	3
INED 414 Electronics for Teach.	3	ENGL 301 Public Speaking	3
TEXT 460 Textile Processes	3	INED 317 Mgt. of Ind. Ed. Labs	3
Social Science Requirement[3]	3	Social Science Requirement[3]	3
Elective	3	Elective	2
	17		17

SENIOR YEAR

CAAH 303 or 304 Evol of Visual Arts I	3	ED 498 Secondary Content Area Reading	3
INED 405 Course Org and Eval	3	INED 402 Directed Teaching	12
INED 422 Hist and Phil of Industrial and Vocational Ed	3		15
INED 425 Teaching Industrial Subjects	3		
INED 441 Comp Lab in Industrial Ed	3		
Elective	2		
	17		

135 Total Semester Hours

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[1] Both biological and physical laboratory sciences must be represented with an 8 credit sequence in one

[2] Select from ENGL 202 203 204 205 206 207 208 209

[3] Select from economics geography history psychology sociology At least two fields must be represented with 6 but not more than 6 hours in one field

VOCATIONAL-TECHNICAL EDUCATION OPTION

The Vocational-Technical Education option is designed to prepare teachers of vocational and technical subjects in the senior high schools, area vocational centers, and technical education centers All elective courses in this option will be in an area of specialization or related fields Teachers graduating from this option will possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization

FRESHMAN YEAR

First Semester		Second Semester	
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	INED 105 Machining Practices	3
INED 101 Intro to Ind Ed	1	INED 107 Drafting for Ind Ed II	3
INED 102 Woodworking I	2	Mathematics Requirement	3
INED 106 Drafting for Ind Ed I	3	Social Science Requirement[3]	3
Mathematics Requirement	3	Elective	1
Elective	3		16
	16		

SOPHOMORE YEAR

INED 203 Basic Metal Processes	3	GC 104 Graphic Arts I	3
INED 205 Power Technology	3	HIST 191 World in the 20th Century	3
Literature Requirement[1]	3	INED 208 Electricity	3
Science Requirement[2]	4	Area Specialty	3
Elective	4	Science Requirement[2]	4
	17	Elective	1
			17

SUMMER

INED 350 Industrial Cooperative Experience I[4] 1

JUNIOR YEAR

ED 302 Educational Psychology	3	CAAH 303 or 304 Evol of Visual Arts	3
ED 458 Health Education	3	ED 335 Adoles Growth and Dev	3
INED 302 Dwelling Materials and Construction Method	2	ENGL 301 Public Speaking	3
MUS 210 or 311 Music Appreciation	3	INED 317 Mgt of Ind Ed Labs	3
Science Requirement[2]	4	Area of Specialty	3
Social Science Requirement[3]	3	Social Science Requirement[3]	3
	18		18

SUMMER

INED 450 Industrial Cooperative Experience II[4] 1

SENIOR YEAR

INED 405 Course Organization and Evaluation	3	ED 498 Secondary Content Area Reading	3
INED 422 Hist. and Phil. of Industrial and Voc. Ed.	3	INED 402 Directed Teaching	12
INED 425 Teaching Ind. Subj.	3		15
INED 441 Comp. Lab. in Ind. Ed.	3		
Area of Specialty	3		
Elective	1		
	16		

135 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Both biological and physical laboratory sciences must be represented with an 8-credit sequence in one

[3] Select from economics, geography, history, psychology. At least two fields must be represented with 6, but not more than 6 credits in one field

[4] Area of specialization requires 400 clock hours work experience

SCIENCE TEACHING

The program leading to a Bachelor of Science degree in Science Teaching is designed for students planning to teach biological sciences, chemistry, earth science, mathematical sciences, or physical sciences on the secondary school level. The required science electives are included to give some degree of competency in a field other than the major area. Students are urged to discuss the National Teacher's Examination with their adviser upon completion of the sophomore year.

TEACHING AREA: BIOLOGICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	HIST 172 Western Civilization	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 301 Stat. Theory and Meth. I	3
Elective	3	MUS 210 or 311 Music Appreciation	3
	15		16

SOPHOMORE YEAR

BIOL 110 Prin. of Biology I	5	BIOL 111 Principles of Biology II	5
ED 302 Educational Psychology	3	BIOCH 210 Elemetary Biochemistry	4
HIST 173 Western Civilization	3	ED 335 Adol. Growth and Dev.	3
Literature Requirement[1]	3	Social Science Requirement[2]	3
Chemistry Elective	4	Elective	3
	18		18

JUNIOR YEAR

ED 301 Principles of American Ed.	3	BIOSC 201 Plant Diversity	4
GEN 302 Introductory Genetics	4	BIOSC 202 Animal Diversity	4
MICRO 305 General Microbiology	4	ED 427 Methods and Materials in Sec. Sciences[4]	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
Composition or Speech[3]	3	Elective	4
	18		19

SENIOR YEAR

(Block Schedule — Either Semester)

BOT 421 Plant Physiology	4	ED 412 Directed Teaching	12
or ZOOL 223 Human Physiology	4	ED 498 Secondary Content Area Reading	3
CAAH 303 or 304 Evol of Vis Arts I	3		15
ED 458 Health Education	3		
ED 471 The Exceptional Child	3		
Social Science Requirement[2]	3		
	16		

135 Total Semester Hours

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[1] Select from ENGL 202 203 204 205 206 207 208 209

[2] Anthropology economics geography philosophy political science psychology religion sociology

[3] Select from ENGL 231 301 312 314

[4] Should be taken during the semester preceding student teaching

TEACHING AREA: CHEMISTRY

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 108 Cal of One Var II	4
MTHSC 106 Cal of One Var I	4	Elective	1
Elective	1		16
	17		

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 227 Organic Chemistry Lab	1	ED 335 Adol Growth and Dev	3
ED 302 Educational Psychology	3	HIST 173 Western Civilization	3
HIST 172 Western Civilization	3	Social Science Requirement[2]	6
MTHSC 206 Calculus of Sev Var	4	Elective	1
Literature Requirement[1]	3		16
Elective	1		
	18		

JUNIOR YEAR

CH 313 Quantitative Analysis	3	CH 331 Physical Chemistry	3
ED 301 Principles of American Ed	3	CH 339 Physical Chem Lab	1
MTHSC 301 Stat Theory and Meth I	3	ED 427 Methods and Materials in Secondary Science[4]	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
Composition or Speech[3]	3	Elective	6
Elective	1		17
	17		

SENIOR YEAR

(Block Schedule — Either Semester)

CAAH 303 or 304 Evol of Vis Arts	3	ED 412 Directed Teaching	12
CH 332 Physical Chemistry	3	ED 498 Secondary Content Area Reading	3
CH 340 Physical Chem Lab	1		15
CH 402 Inorganic Chemistry	3		
ED 458 Health Education	3		
ED 471 The Exceptional Child	3		
MUS 210 or 311 Music Appreciation	3		
	19		

135 Total Semester Hours

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[1] Select from ENGL 202 203 204 205 206 207 208 209

[2] Anthropology economics geography philosophy, political science, psychology, religion, sociology

[3] Select from ENGL 231 301 312 314

[4] Should be be taken during the semester preceding Directed Teaching

TEACHING AREA: EARTH SCIENCE

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 102 Intro to Math Analysis	3
MTHSC 101 Finite Probability[1]	3	Elective	1
Elective	1		
	16		15

SOPHOMORE YEAR

ED 302 Educational Psychology	3	ED 335 Adol Growth and Dev	3
GEOL 101 Physical Geology	4	GEOL 102 Historical Geology	4
HIST 172 Western Civilization	3	HIST 173 Western Civilization II	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
Literature Requirement[2]	3	Social Science Requirement[6]	3
	17		17

JUNIOR YEAR

ASTR 101 Solar Astronomy	3	ED 427 Methods and Materials in Secondary Science[4]	3
ED 301 Principles of American Ed	3	GEOL 405 Geomorphology	4
GEOL 306 Mineralogy	3	PHYS 240 Physics of the Weather	3
MTHSC 203 Elem Stat Inference	3	Composition and Speech[3]	3
Elective	6	Science Requirement[5]	3
	18	Social Science Requirement[6]	3
			19

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol of Vis Arts	3	ED 412 Directed Teaching	12
ED 458 Health Education	3	ED 498 Secondary Content Area Reading	3
ED 471 The Exceptional Child	3		15
MUS 210 or 311 Music Appreciation	3		
Science Requirement[5]	3		
Elective	3		
	18		

135 Total Semester Hours

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[1] Prerequisite Satisfactory score on the Mathematics Achievement Test, Level II or consent of instructor.

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] Select from ENGL 231, 301, 312, 314

[4] To be taken in the semester preceding Directed Teaching

[5] Select from biological sciences, chemistry, geology, physics

[6] Select from economics, geography, philosophy, political science, psychology, religion, sociology

TEACHING AREA: MATHEMATICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab. I	1	BIOL 106 General Biology Lab. II	1
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 108 Cal. of One Var. II	4
MTHSC 106 Cal. of One Var. I	4	Elective	3
	16		18

SOPHOMORE YEAR

ED 302 Educational Psychology	3	CPSC 110 Elem. Comp. Prog.	3
HIST 172 Western Civilization	3	ED 335 Adol. Growth and Dev.	3
MTHSC 206 Calculus of Sev. Var.	4	HIST 173 Western Civilization	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
Literature Requirement[1]	3	MUS 210 or 311 Music Appreciation	3
	17	Elective	1
			17

JUNIOR YEAR

ED 301 Principles of American Ed.	3	ED 426 Methods and Materials in Secondary Mathematics[5]	3
MTHSC 301 Stat. Theory and Meth. I	3	MTHSC 311 Linear Algebra	3
MTHSC 308 College Geometry	3	MTHSC 408 Topics in Geometry	3
Mathematics Requirement[3]	3	Composition or Speech[2]	3
Social Science Requirement[4]	3	Social Science Requirement[4]	3
Elective	3	Elective	3
	18		18

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol. of Vis. Arts	3	ED 412 Directed Teaching	12
ED 458 Health Education	3	ED 498 Secondary Content Area Reading	3
ED 471 The Exceptional Child	3		15
MTHSC 412 Intro. to Modern Alg.	3		
MTHSC 453 Advanced Calculus I	3		
Mathematics Requirement[3]	3		
	18		

137 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Select from ENGL 231, 301, 312, 314

[3] CPSC 130, MTHSC 400, 403, 405, 440, 454

[4] Economics, geography, philosophy, political science, psychology, religion, sociology

[5] To be taken in the semester preceding Directed Teaching

TEACHING AREA: PHYSICAL SCIENCES

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab. I	1	BIOL 106 General Biology Lab. II	1
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ED 100 Orientation	1	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 106 Cal. of One Var. I	4
MTHSC 101 Finite Probability	3	Elective	3
Elective	3		18
	18		

SOPHOMORE YEAR

ED 302 Educational Psychology	3	CH 201 Survey of Organic Chemistry	4
HIST 172 Western Civilization	3	ED 335 Adol. Growth and Dev.	3
PHYS 207 General Physics I	4	HIST 173 Western Civilization	3
Literature Requirement[1]	3	PHYS 208 General Physics II	4
Science Requirement[3]	3	Social Science Requirement[2]	3
Elective	1		17
	17		

JUNIOR YEAR

ASTR 101 Solar System Astronomy	3	ASTR 102 Stellar Astronomy	3
ED 301 Principles of American Ed	3	ED 427 Methods and Materials in Secondary Science[5]	3
GEOL 101 Physical Geology	4	GEOL 102 Historical Geology	4
Social Science Requirement[2]	3	PHYS 460 Contemporary Physics for High School Teachers	3
Elective	3	Composition or Speech[4]	3
	16		16

SENIOR YEAR

(Block Schedule—Either Semester)

CAAH 303 or 304 Evol of Vis Arts	3	ED 412 Directed Teaching	12
ED 458 Health Education	3	ED 498 Secondary Content Area Reading	3
ED 471 The Exceptional Child	3		
MUS 210 or 311 Music Appreciation	3		
Science Requirement[3]	3		
Elective	3		
	18		15

135 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Economics, geography philosophy political science, psychology, religion, sociology

[3] Select from biological sciences, chemistry, geology, or physics

[4] Select from ENGL 231, 301, 312, 314

[5] Should be taken during the semester preceding DirectedTeaching

COLLEGE OF ENGINEERING

The College of Engineering offers eight professional Bachelor of Science degree programs: Agricultural Engineering, Ceramic Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering, and a Bachelor of Science degree program in Engineering Analysis. Each of the engineering programs offered leads to a wide range of career opportunities and serves as preparation for further study at the graduate level.

PROFESSIONAL CURRICULA

Each of the eight professional curricula, except Computer Engineering and Industrial Engineering, is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, the recognized national accrediting agency for professional curricula in engineering. The curriculum in Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.

Although the College of Engineering does not offer specific options or majors in each of these professional curricula, the instruction includes many phases of each respective field. Thus, a civil engineering student is graduated in civil engineering rather than in structural engineering, highway engineering, sanitary engineering, or other such options. However, a student who wishes to study within the areas encompassed by these options will find adequate courses within the Civil Engineering curriculum to prepare for work in any of these areas. In the same way, the other engineering curricula include thorough education in various phases of the field of specialization without overemphasizing one phase to the neglect of others. The professional curricula lead to a Bachelor of Science degree in the specific professional area.

POLICY ON TRANSFER FROM THE FRESHMAN ENGINEERING PROGRAM TO A PROFESSIONAL PROGRAM IN THE COLLEGE OF ENGINEERING

To transfer from the freshman engineering program to one of the eight professional-oriented curricula, a student must complete the freshman curriculum and achieve an overall 2.0 grade-point ratio. The transfer request must be initiated by the student during the semester in which he/she expects to complete the freshman curriculum and prior to preregistration. Students who fail to meet requirements for transfer to a professional curriculum may remain in the freshman engineering program to establish transfer eligibility, but cannot enroll in engineering courses other than CRE 310, EG 109, 208, EM 201, 202, ENGR 180.

POLICY ON HUMANITIES AND SOCIAL SCIENCES FOR ENGINEERING CURRICULA

To ensure that young engineers are aware of their responsibilities to society and are able to consider societal factors in the decision-making process, courses in the humanities and social sciences must be an integral part of their education. While there are many humanistic-social science courses that may be of interest and value to the engineering student, the objectives of the profession require the concentration of some courses in one or two areas rather than a selection of totally unrelated, introductory courses in different areas.

To meet these professional objectives, a student must have accumulated a minimum of 16 credit hours in the humanities and social sciences. These credits must satisfy the following criteria:

1. Either
   a) Nine credit hours in a given subject area
   or
   b) Six credit hours in each of two different subject areas.
2. A minimum of 6 credit hours in humanities, which must include the following:
   a) Three credit hours selected from sophomore literature courses (200 level) or foreign language literature (300 level or higher).
   b) Three credit hours selected from the following (excluding skills courses): art and architectural history, drama, foreign language literature (300 level or higher), humanities, music, philosophy, religion, or sophomore literature courses (200 level), and visual arts.
3. A minimum of 6 credit hours in social sciences, selected from anthropology, economics, geography, history, political science, psychology, and sociology (including crosslisted rural sociology courses).

Additional requirements (e.g., an economics or second literature course) may be specified by individual departments. Students should consult with their academic advisers for details.

The courses which can be taken to satisfy requirements 1, 2, and 3 above must be selected from the approved list available from the departmental adviser.

POLICY ON ELECTIVES FOR THE ENGINEERING AND ENGINEERING TECHNOLOGY CURRICULA

Class advisers must approve any course taken for elective credit in the Engineering and Engineering Technology curricula. Courses excluded for elective credit in the Engineering curricula are as follows: ENGL 100, MTHSC 101, 102, 105, 115, 116, 215, 216, PHYS 207, 208, 460. Some examples of courses excluded for elective credit in the Engineering Technology curriculum are as follows: ENGL 100, MTHSC 101, 102, 115, 116, 215, 216, PHYS 200, 460.

COURSE PREREQUISITE

A grade-point ratio of 1.8 or higher is required for registration in all engineering and engineering technology courses numbered 300 or higher. For undergraduate students who enter Clemson after May 15, 1983, a cumulative grade-point ratio of 2.0 or higher is required for registration in all engineering and engineering technology courses numbered 300 or higher.

REQUIREMENTS FOR GRADUATION

In addition to other institutional requirements, and effective with all students entering after May 15, 1981, the following will apply to all candidates for a baccalaureate degree in Engineering and Engineering Technology.

For graduation, candidates will be required to have a 2.0 or higher cumulative grade-point ratio in all engineering and engineering technology courses taken at Clemson University. All of these courses exclusively utilize the word "Engineering" in the course designator (i.e., AGE 221, ME 499, etc.)

The courses required of all freshman engineering students follow.

FRESHMAN YEAR PROGRAM

All first-year engineering students are admitted by the University into the freshman engineering program rather than specific professional engineering curricula. Students in the freshman engineering program pursue a common curriculum which forms the first year for all eight professional engineering curricula available at Clemson.

First Semester		**Second Semester**	
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry[3]	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
ENGR 100 Career Guidance Seminar[1]	0	ENGR 100 Career Guidance Seminar[1]	0
ENGR 180 Engineering Concepts	3	MTHSC 108 Cal. of One Var. II	4
or Humanistic—Social Elective[2]	3	PHYS 122 Phys. with Cal. I	3
MTHSC 106 Cal. of One Var. I	4	Humanistic—Social Elective[2]	3
Elective	3	or ENGR 180 Engineering Concepts	3
	17		17

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[1] One-half of the entering freshman class will enroll during the first semester, the other one-half will enroll during the second semester. This is a required course.

[2] See policy on Humanities and Social Sciences for Engineering curricula, page 119.

[3] See adviser.

ENGINEERING ANALYSIS

This curriculum is a four-year engineering science-oriented course of study. Its objectives are two-fold. These are (1) to prepare a student for employment in areas of engineering activity requiring a high level of analytical competency, and (2) to provide a flexible undergraduate preparation for the study of engineering at the graduate level.

The curriculum leads to the Bachelor of Science degree in Engineering Analysis. Requirements for this degree are stated in terms of subject matter area rather than in terms of specific courses. Degree requirements are as follows:

See Freshman year above.

	Hours Credit
Area of Concentration	12
Basic Science (including 8 hours of physics)	16
Engineering Science (distributed in at least six engineering science areas)	32
Humanistic—Social Studies	32
Mathematical Sciences (including 12 hours of post-calculus mathematical sciences)	24
Electives	22
Total Semester Hours	138

The educational objectives of the program will be met by the selection of an area of concentration which will be chosen from several specialty areas offered within the professional engineering curricula. The selection of specific courses, particularly in the junior and senior years, will then depend primarily on the choice of the area of concentration. By judicious selection of courses within this flexible structure, a student may prepare himself for entry into the professional schools of law and medicine.

Maximum flexibility within this program is achieved by permitting a student to defer his choice of specialization until the junior year or later. Such deferral will then allow students from junior and senior colleges not offering engineering to transfer into the program with little or no loss in academic credit.

AGRICULTURAL ENGINEERING

The graduate in Agricultural Engineering with broad training in mathematics, physics, chemistry, and the biological sciences as well as comprehensive coverage of the engineering sciences is well equipped to apply engineering to many functions affecting the well-being of mankind. Agricultural engineers are sought by industry and public service organizations primarily for their ability to apply engineering know-how to agricultural production and processing and to the management of land and water resources. Specific areas of interest include power and machinery, soil and water resources engineering, electric power and processing, structures and environment, and food engineering.

This major includes such engineering sciences as mechanics, fluids, thermodynamics, electrical theory, computing devices and systems analysis. The basic agricultural sciences of soil, plants, and animals are included to provide a foundation for agricultural engineering analysis and design. Also included are the important facets of energy conversion, engineering properties of biological materials, research methods, and use of economy and integrity in design.

Graduate programs lead to the Master of Science, Master of Engineering, and Doctor of Philosophy degrees.

Opportunties for employment of agricultural engineering graduates include design engineers, research engineers, production engineers, and sales engineers with industry; teachers, research, extension, and field engineers with state and federal agencies; and engineers in the private sector.

Note: Additional information concerning the Engineering Analysis curriculum is available in the Office of the Dean of Engineering.

See page 121 for Freshman year

SOPHOMORE YEAR

First Semester		Second Semester	
AGE 221 Soil and Water Resources Engineering I	3	AGE 212 Fund of Mechanization	3
EG 109 Engineering Graphics	2	EM 202 Engr Mech Dynamics	3
EM 201 Engr Mechanics Statics	3	MTHSC 208 Intro to Ord Diff Equa	4
MTHSC 206 Calculus of Sev Var	4	PHYS 222 Phys with Cal III	3
PHYS 221 Phys with Cal II	3	Elective	4
PHYS 223 Physics Lab II	1		17
Literature Requirement[1]	3		
Elective	1		
	20		

JUNIOR YEAR

AGE 353 Computational Systems	2	AGE 355 Engr Analysis and Creat	2
AGE 362 Energy Conv in Ag Sys	3	AGE 364 Ag Waste — Mgt Sys	2
E&CE 307 Basic Elec Engr	2	AGE 465 Engr Prop of Biol Mat	2
E&CE 309 Elec Engr Lab I	1	AGRON 202 Soils	4
EM 304 Mechanics of Materials	3	EM 320 Fluid Mechanics	3
ME 310 Thermodynamics and Heat Transfer	3	Engineering Science Elective[2]	3
Animal Science Elective[2]	3	Plant Science Elective[2]	3
Engineering Science Elective[2]	3		19
	20		

SENIOR YEAR

AGE 416 Agric Machinery Design	3	AGE 422 Soil and Water Resources Engineering II	3
AGE 431 Ag Struct and Environ Design	4	AGE 442 Agric Process Engr	3
AGE 471 Research I	1	AGE 472 Research II	1
ECON 200 Economic Concepts	3	ENGL 301 Public Speaking	3
or ECON 211 Prin of Economics	3	or ENGL 314 Technical Writing	3
Humanistic-Social Elective[3]	3	Humanistic-Social Elective[3]	3
Elective	2	Mathematics Elective[2]	3
	16		16

142 Total Semester Hours

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[1] Select from ENGL 202 203 204 205 206 207 208 209

[2] See adviser

[3] These courses must be selected from the list of approved Humanistic-Social electives and meet the policy requirements on Humanistic and Social Sciences for engineering curricula

CERAMIC ENGINEERING

Window glass, implantable teeth, brick, ceramic bones, nuclear fuel, radomes, solid-state electronic devices, and bathroom fixtures are illustrations of the variety of products of the multibillion-dollar ceramic industry. Ceramic engineers are engineers to this industry, providing professional service in research, design, technical sales, production, and management.

The curriculum is an engineering curriculum with 75 percent of the course time devoted to coursework common to all engineers and 25 percent to specialization in the field of ceramics. The core courses are in mathematics, basic science, engineering science, humanities, and social sciences. The specialized courses are in nonmetallic minerals, high-temperature chemistry, thermal processing, and material characterization.

The curriculum leads to the degree of Bachelor of Science in Ceramic Engineering. Graduate courses are offered leading to advanced degrees.

See page 121 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CRE 202 Ceramic Materials	3	CRE 201 Intro. to Ceramic Engr.	2
CRE 204 Laboratory Procedures	1	MTHSC 208 Intro. to Ord. Diff. Equa.	4
CRE 310 Intro. to Material Science	3	PHYS 222 Phys. with Cal. III	3
MTHSC 206 Calculus of Sev. Var.	4	Literature Requirement[1]	3
PHYS 221 Phys. with Cal. II	3	Planned Elective[2]	5
Literature Requirement[1]	3	Elective	1
Elective	1		18
	18		

JUNIOR YEAR

CH 331 Physical Chemistry	3	CRE 307 Thermal Processing of Ceramics	3
CRE 302 Thermo-Chemical Cer.	3	CRE 309 Research Methods	2
CRE 304 Experiment Design	2	CRE 311 Kinetics of Mat. Processes	3
E&CE 307 Basic Elec. Engr.	2	E&CE 308 Electronics and Electromechanics	2
E&CE 309 Elec. Engr. Lab. I	1	E&CE 310 Elec Engr. Lab. II	1
EM 201 Engr. Mechanics: Statics	3	Planned Elective[2]	3
Planned Elective[2]	3	Elective	3
	17		17

SENIOR YEAR

CRE 402 Solid State Ceramics	3	CRE 403 Glasses	3
EM 304 Mechanics of Materials	3	Planned Elective[2]	14
ENGL 301 Public Speaking	3		17
Planned Elective[2]	6		
Elective	2		
	17		

138 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Nine credits of planned electives must be taken in humanistic—social science courses. Nineteen credits of planned electives should be technical courses selected with the help of class adviser

CHEMICAL ENGINEERING

Chemical Engineering is unique in that it is based on the three sciences of chemistry, physics, and mathematics. The curriculum emphasizes a broad range of fundamental principles in science and engineering, as well as communications skills and humanities, rather than a narrow specialization. As a result, graduates are avidly sought by industries in many areas of technology such as nuclear power, synthetic fibers and textiles, pharmaceuticals, pulp and paper, computers, foods, metals, ceramics, instrumentation and automatic control, and petroleum as well as the traditional chemical process industries. The chemical engineer is in the forefront of the fight against environmental pollution and is leading the way in applying engineering technology to the solution of medical and health-related problems. Advanced structural materials, electronic and photonic devices, and biotechnology are just some of the exciting new fields in which chemical engineers are making pivotal contributions.

The chemical engineering graduate, because of his broad, fundamentals background, is uniquely prepared for a wide variety of careers in which he can apply his abilities and education. Chemical engineers may work in basic research and development, engineering design of new plants, operations and management of production facilities, or technical marketing and sales. The careers of many chemical engineers lead to top executive positions in their companies. By the judicious choice of electives made with the help of his adviser, a chemical engineering student may tailor his education to further a specific career objective. Many students use electives to prepare for entry into professional schools, such as medicine, dentistry, law, or business, or for specialization in technical areas such as environmental control or polymer processing. The Department of Chemical Engineering offers advanced study leading to the Master of Science and Doctor of Philosophy degrees.

See page 121 for Freshman year

SOPHOMORE YEAR

First Semester		**Second Semester**	
CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CHE 201 Intro to Chem Engr	3	CH 229 Organic Chemistry Lab	1
EG 109 Engr Graphics	2	CHE 220 Chemical Engr Thermodynamics I	3
MTHSC 206 Calculus of Sev Var	4	EM 201 Engr Mechanics. Statics	3
PHYS 221 Phys with Cal II	3	MTHSC 208 Intro. to Ord. Diff Equa	4
Literature Requirement[1]	3	Literature Requirement[1]	3
	18	Elective	1
			18

JUNIOR YEAR

CH 331 Physical Chemistry	3	CH 332 Physical Chemistry	3
CH 339 Physical Chemistry Lab	1	CH 340 Physical Chemistry Lab.	1
CHE 301 Unit Op Theory I	3	CHE 302 Unit Op Theory II	3
CHE 352 Proc Mod and Num Methods	3	CHE 306 Unit Op Lab I	2
E&CE 307 Basic Elec Engr	2	CHE 321 Chem Engr Thermo II	3
E&CE 309 Elec Engr Lab I	1	CHE 353 Process Dynamics	3
EM 304 Mech of Materials	3	Social Science Elective[2]	3
ENGL 314 Technical Writing	3		18
	19		

SENIOR YEAR

CHE 403 Unit Op Theory III	3	CHE 401 Transport Phenomena	3
CHE 407 Unit Op Lab II	3	CHE 422 Process Dev., Design and Optimization of Chem Engr Sys II	3
CHE 421 Process Dev., Design and Optimization of Chem Engr Sys I	3	CHE 441 Chem Engr Senior Seminar II	0
CHE 440 Chem Engr Senior Seminar I	0	CRE 419 Sci of Engr Materials	3
CHE 450 Chem Engr Kinetics	3	MTHSC 425 Ortho Functions and Bound Val Prob	3
Social Science Elective[2]	3	Humanistic—Social Elective[2]	3
Elective	3	Elective	3
	18		18

143 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] See Policy on Humanities and Social Sciences for Engineering Curricula, page 119

CIVIL ENGINEERING

Civil engineering involves the planning, design, construction, maintenance, and operation of facilities and systems to control and improve the environment for modern civilization. Civil engineering is the broadest of the engineering professions, being the stem from which most other branches of engineering have developed.

The program in Civil Engineering leads to the Bachelor of Science degree and is designed to equip the graduate with a knowledge of basic science, engineering science, and engineering design. The civil engineering graduate is prepared to work immediately upon graduation in practically any of the areas of the profession. These include traffic and transportation engineering, structural engineering, construction, soils and foundation engineering, ocean and coastal engineering, water resources engineering, public works engineering, environmental engineering, and others. The civil engineering student is also educated in the humanities, social sciences, and in economic issues. A concerned society demands economy as well as realistic consideration of the resulting human impacts on the engineer's endeavors.

Graduates are encouraged to become registered engineers and to continue their education throughout their professional careers. Many students find that programs in Civil Engineering provide excellent preparation for careers in technical sales and management.

See page 121 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CE 201 Surveying	3	EG 209 Intro. to Engr./Comp Graphics	2
EM 201 Engineering Mechanics: Statics	3	EM 304 Mechanics of Materials	3
MTHSC 206 Calculus of Sev. Variables	4	EM 305 Mechanics of Materials Lab.	1
PHYS 221 Physics with Calculus II	3	MTHSC 208 Intro. to Ord. Diff. Eq.	4
Literature Requirement[1]	3	PHYS 222 Physics with Calculus III	3
Elective	1	Literature Requirement[1]	3
	17	Elective	1
			17

JUNIOR YEAR

CE 205 Civil Engr. Comp. Ap.	3	CE 302 Structural Steel Design	3
CE 301 Structural Analysis I	3	CE 310 Transportation Engineering	4
CE 320 Intro. to Cons. Materials	3	CE 324 Intro. to Construction Engineering	3
CRE 310 Intro. to Material Science	3	EM 320 Fluid Mechanics	3
EM 202 Engr. Mechanics: Dynamics	3	EM 322 Fluid Mechanics Lab.	1
ENGL 314 Technical Writing	3	ESE 401 Environmental Engineering	3
	18		17

SENIOR YEAR

CE 330 Soil Mechanics	4	CE 402 Reinforced Concrete Design	3
CE 422 Hydraulics and Hydrology	3	CE 425 Engineering Relations	3
E&CE 307 Basic Electrical Engineering	2	ME 310 Thermodynamics and Heat Transfer	3
E&CE 309 Electrical Engineering Lab I	1	Humanistic—Social Elective[2]	3
ECON 200 Economic Concepts	3	Technical Elective[2]	3
or ECON 211 or 212 Principles of Econ	3	Elective	3
Technical Elective[2]	3		18
Elective	2		
	18		

139 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2] See adviser for list of approved Technical Electives and Humanistic-Social Science Electives.

COMPUTER ENGINEERING

The program in Computer Engineering leads to a Bachelor of Science degree which provides an indepth education into a wide range of computer topics including computer hardware, software, modeling and applications. Emphasis is placed on giving students hands-on experience with computers of all sizes (micro, mini, and large) by solving a wide range of real-world problems using engineering principles.

The career opportunities for computer engineers are excellent. The rapid advances in microelectronics and for growth of microcomputer applications, as well as continued expansion of large computer systems, indicate this strong demand will continue.

The curriculum is based on three main concepts: (1) It is an engineering curriculum which provides a solid foundation in mathematics, basic sciences, and the humanistics while emphasizing the engineering approach to problem solving. (2) The required computer courses provide an excellent knowledge of hardware, software, and systems. (3) A large number of elective hours are provided which allows students to specialize in one or more computer areas. The Computer Engineering program prepares a student for entering the engineering profession in a rapidly advancing area, and it provides a good background for study in other professions.

See page 121 for Freshman year

SOPHOMORE YEAR

First Semester		Second Semester	
E&CE 201 Logic and Comp. Devices	3	CPSC 210 Programming Methodology	4
ECON 200 Economic Concepts	3	E&CE 202 Electric Circuits I	3
or ECON 211 or 212 Prin. of Econ.	3	E&CE 203 Elec. Cir. Lab. I	1
MTHSC 206 Cal. of Sev. Variables	4	E&CE 250 Prin. of Digital Comp. Sys.	3
PHYS 221 Physics with Cal. II	3	MTHSC 208 Intro. to Ord. Diff. Equations	4
PHYS 223 Physics Lab. II	1	MTHSC 219 Intro. to Disc. Methods	3
Literature	3		18
	17		

JUNIOR YEAR

E&CE 301 Elec Cir II	3	E&CE 321 Electronics II	3
E&CE 303 Elec Cir Lab II	1	E&CE 326 Electronics Lab I	1
E&CE 320 Electronics I	3	E&CE 330 Elec Sys Analysis	3
E&CE 329 Computer Systems Structures	3	E&CE 425 Microcomputer Interfacing	3
ENGL 314 Technical Writing	3	MTHSC 400 Theory of Probability	3
or ENGL 301 Public Speaking	3	Hum and Social Science Elective[2]	3
MTHSC 311 Linear Algebra	3	Elective	3
Engineering Science Elective[1]	3		19
	19		

SENIOR YEAR

E&CE 429 Computer Organization	3	E&CE 405 Design Projects in E&CE	2
E&CE 450 Comp System Design Proj	2	Computer Engineering Elective[5]	3
Engineering Science Elective[1]	3	Design Elective[4]	6
Hum and Social Science Elective[2]	3	Hum and Social Science Elective[2]	3
Major Design Course[3]	3	Major Design Course[3]	3
Elective	4		17
	18		

142 Total Semester Hours

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[1] Engineering Science Electives must be chosen from a list of courses approved by the department

[2] The University General Education requirements may influence course selection here

[3] Major Design Course E&CE 417, 426, 431, 468

[4] Design Electives must be chosen from a list of courses approved by the department

[5] Computer Engineering Electives E&CE 404, 430, 438, 452, 460, 463, 467, 471

ELECTRICAL ENGINEERING

Responsibilities of the electrical engineering profession range from highly analytical problem solving to detailed design. The Electrical Engineering program is intended to emphasize both the close relationship of computers to all phases of the profession and the major role that computers play in the curriculum at Clemson.

Systems, electronic networks, and electromagnetic fields provide the core curriculum areas. These fundamental studies in analysis and experimentation receive further development in elective courses. Humanistic—social electives provide the graduate with the ability to address the "why" of engineering as well as the "how."

Students who are interested in communications study information theory, electromagnetic theory, switching circuits, and electronics.

Technological innovations in electronics have resulted in increasingly complex solid-state components—the transistor, integrated circuit, and LSI component. The electronics emphasis includes solid-state devices and circuits and integrated circuit technology.

The department offers courses in real-time computing, computer language structures, theory and design of digital computers, computation and simulation of physical systems, and information processing and data handling.

Energy systems analysis and energy conversion are appropriate for students who plan to work for electric utilities, electrical equipment manufacturers, or companies which are large users of electrical energy.

See page 121 for Freshman year

SOPHOMORE YEAR

First Semester		Second Semester	
E&CE 201 Logic and Comp Devices	3	E&CE 202 Electric Circuits I	3
ECON 200 Economic Concepts	3	E&CE 203 Electric Circuits Lab I	1
or ECON 211 or 212 Prin of Econ	3	E&CE 250 Principles of Digital Computer Systems	3
EM 201 Engr Mechanics Statics	3	EM 202 Engr Mechanics Dynamics	3
MTHSC 206 Calculus of Sev Var	4	MTHSC 208 Intro to Ord Diff Equa	4
PHYS 221 Phys with Cal II	3	PHYS 222 Phys with Cal III	3
Literature Requirement[1]	3	Physics Lab Requirement[2]	1
Physics Lab Requirement[2]	1		
	19-20		17-18

JUNIOR YEAR

E&CE 301 Electric Circuits II	3	E&CE 302 Linear Control Systems	3
E&CE 303 Elec Circuits Lab II	1	E&CE 321 Electronics II	3
E&CE 317 Rand Analysis of Elec Sys	3	E&CE 326 Electronics Lab I	1
E&CE 320 Electronics I	3	E&CE 330 Elec Sys Analysis	3
E&CE (PHYS) 340 Electromagnetics I	2	E&CE (PHYS) 341 Electromagnetics II	2
ENGL 301 Public Speaking	3	E&CE 360 Electric Power Engineering	3
or ENGL 314 Technical Writing	3	ME 310 Thermodynamics and Heat Transfer	3
Humanistic Social Elective[3]	3		
	18		18

SENIOR YEAR

E&CE 451 System Design Project	2	Humanistic-Social Elective[3]	3
Humanistic Social Elective[3]	3	Technical Elective[4]	9
Technical Elective[4]	9	Elective	4
Elective	3		16
	17		

140 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] PHYS 223 or 224 (Only one is required.)

[3] See College of Engineering Policy on Humanities and Social Science, page 119

[4] These courses must include a minimum of 10 hours of design content, as determined from the departmental list

INDUSTRIAL ENGINEERING

Industrial engineers design, install, and improve the complex systems which provide both goods and services vital to our society and economy. These systems integrate people, materials, and equipment and thereby place unique demands for breadth of preparation upon industrial engineers. Knowledge is required in mathematical, physical, and social sciences; economic, operational, and engineering analyses; and the principles and techniques of engineering design. Because of the closeness of industrial engineering problems to management, a special need exists for industrial engineers to be able to work and communicate with managers.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry. However, today fully one-third of practicing industrial engineers are employed in nonmanufacturing institutions such as hospitals and banks and in government service.

In addition to numerous employment opportunities in South Carolina and other states, an industrial engineering graduate may pursue further formal education. The Department of Industrial Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees.

See page 121 for Freshman year

SOPHOMORE YEAR

ECON 200 Economic Concepts[6]	3	ACCT 200 Basic Accounting[5]	3
MTHSC 206 Calculus of Several Var	4	EM 201 Engineering Mechanics: Statics	3
PHYS 221 Physics with Calculus II	3	IE 265 Work Meth. and Measurement I	3
Engineering Graphics Elective[4]	2	IE 280 Comp. Meth. in Industrial Engr.	2
Literature Requirement[3]	3	MTHSC 208 Intro. to Ord. Diff. Equa.	4
Materials/Processes Elective[4]	3	Literature Requirement[3]	3
	18		18

JUNIOR YEAR

E&CE 307 Basic Electrical Engineering	2	HIST 309 History of Technology	3
E&CE 309 Electrical Engineering Lab I	1	or HIST 310 American Technology	3
EM 304 Mechanics of Materials	3	IE 361 Ind. Application of Statistics	3
IE 366 Work Methods and Measurement II	3	IE 473 Microcomp. Appl. in Ind. Engr	3
IE 480 Meth. of Operation Research I	3	IE 481 Meth. of Operation Research II	3
IE 484 Engineering Economic Analysis	3	ME 310 Thermodynamics and Heat Transfer	3
MTHSC 400 Theory of Probability	3	or EM 320 Fluid Mechanics[7]	3
	18	MTHSC 401 Statistical Methodology	3
			18

SENIOR YEAR

ENGL 314 Technical Writing[2]	3	IE 465 Facilities Planning and Design	3
IE 482 Systems Modeling	3	IE 496 Senior Research II	1
IE 486 Production Planning and Control	3	Humanistic-Social Elective[1]	3
IE 495 Senior Research I	1	Technical Elective[4]	3
Basic Science Elective[4]	3	Elective	7
Human Resources Elective[4]	3		17
Technical Elective[4]	3		
	19		

142 Total Semester Hours

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[1] See Policy on Humanities and Social Sciences for Engineering Curricula, page 119
[2] ENGL 301 accepted with adviser's consent.
[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209
[4] Select from an approved list. (See adviser.)
[5] ACCT 201 accepted
[6] ECON 211 or 212 accepted
[7] Prerequisite responsibility of student

MECHANICAL ENGINEERING

Breadth, individuality, and flexibility are inherent characteristics of the profession of mechanical engineering. Mechanical engineers, in a broad sense, make major contributions to the creation of products and systems that benefit mankind. They work in a wide variety of areas including bioengineering, energy systems, environmental and life-support systems, propulsion and transportation systems, food production, materials processing, automated manufacturing, and construction. A wide spectrum of career opportunities are open to them.

The practice of mechanical engineering includes one or more of the following activities: manufacturing, testing, research, development, design, technical management, technical sales and marketing, construction, and teaching.

In preparing for a 40-45 year professional career, it is necessary to develop the whole person. This requires a balanced program encompassing the humanities, social sciences, communication and computer skills, physical and engineering sciences, design, and laboratory experience. The student starts with the physical sciences and communication skills and progresses through the engineering sciences, ultimately applying the principles learned in such areas as energy conversion and transfer, mechanical design, and systems analysis. Throughout the curriculum, the fundamental nature of engineering as a problem-solving discipline is emphasized.

Most mechanical engineering graduates take positions in industry, government, or business. Many, however, continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

See page 121 for Freshman year.

SOPHOMORE YEAR

First Semester		Second Semester	
CRE 310 Intro to Material Science	3	EM 202 Mechanics Dynamics	3
EG 208 Engr Graphics with Comp Applications	3	ME 202 Engr Mat and Manuf Proc	2
EM 201 Engr Mechanics Statics	3	ME 208 Numerical Method in Engr	3
ME 201 Foundations of Engr Design	2	MTHSC 208 Intro to Ord Diff Equa	4
MTHSC 206 Calculus of Several Var	4	PHYS 222 Physics with Calculus III	3
PHYS 221 Physics with Calculus II	3	Literature Requirement[1]	3
	18		18

JUNIOR YEAR

E&CE 307 Basic Elec Engineering	2	E&CE 308 Elec and Electromechanics	2
E&CE 309 Electrical Engr Lab I	1	E&CE 310 Electrical Engr Lab II	1
EM 304 Mechanics of Materials	3	ENGL 314 Technical Writing	3
EM 305 Mechanics of Materials Lab	1	ME 304 Heat Transfer	3
EM 320 Fluid Mechanics	3	ME 306 Fundamentals of Machine Design	3
ME 302 Dynamic Systems Modeling	3	ME 312 Engr Thermodynamics II	3
ME 311 Engineering Thermo I	3	ME 313 Instrumentation and Measurements	3
	16		18

SENIOR YEAR

ME 400 Senior Seminar	1	ME 402 Intern in Engr Design	2
ME 405 Kinematics and Dynamics of Machinery I	3	ME 414 Mech Sys Lab	1
ME 412 Intro to Comp Flow and Turbomachinery	3	or ME 413 Thermal Sys Lab	1
ME 413 Thermal Systems Lab	1	Humanistic—Social Elective[2]	6
or ME 414 Mech Sys Lab	1	Technical Elective[3]	6
Humanistic-Social Elective[2]	3	Elective	3
Technical Elective[3]	3		18
Elective	4		
	18		

140 Total Semester Hours

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[1] Select from 200-level English literature or 300-level foreign language literature courses.

[2] Select from a list of approved Humanistic Social electives.

[3] Select from the departmental list of approved Technical electives with the assistance of a faculty adviser.

ENGINEERING TECHNOLOGY

(The University is phasing out this curriculum and therefore no new students are being accepted. Accreditation is subject to periodic review. Students in the program should consult with their academic adviser concerning the required curriculum.)

This curriculum is a four-year, applications-and-job oriented plan of study which leads to a Bachelor of Science degree in Engineering Technology. The Engineering Technology program is accredited by the Technology Accreditation Commission of Accreditation Board of Engineering and Technology. It provides a broad base of fundamentals and their application in the areas of electrical, mechanical, and manufacturing engineering technology. In addition, electives amounting to approximately two semesters of work permit developing a program to match the student's aptitudes and interests as related to industrial and other employment opportunities. These opportunities are found in such areas as plant engineering, electrical and mechanical equipment development, production supervision, industrial planning, production methods, technical purchasing and sales, quality control, technical personnel management, specification, operation and supervision of plant environmental and energy systems, equipment maintenance, and technical writing and drawing.

The engineering technologist is typically a practical person interested in applying engineering principles and in organizing people for industrial production, or operation; or in the improvement of devices, processes, methods or procedures, as contrasted to the engineer whose more in-depth, theoretical training qualifies him more for doing original system design.

The Engineering Technology program is designed to educate both regular four-year students and transfer students from community colleges and technical education colleges.

COLLEGE OF FOREST AND RECREATION RESOURCES

The College of Forest and Recreation Resources is concerned with the management, use, and stewardship of all our forest resources and with individual and societal well-being through wise use of leisure These two general areas of study offer broad opportunities in the management of our forest and recreation resources for their maximum service to present and future generations

The College of Forest and Recreation Resources offers curricula designed to prepare students for professional careers in the following areas

1 The Forest Management curriculum prepares graduates for employment as managers and administrators of forest lands for production of timber, water, wildlife, esthetic values, and recreation use

2 The Wood Utilization curriculum prepares graduates for careers in the forest products and allied industries in the areas of production, utilization, and marketing of wood and allied products

3 The Parks, Recreation, and Tourism Management curriculum prepares graduates for careers as managers of leisure-service programs such as those for counties, municipalities, institutions, voluntary and youth-serving agencies, and for various opportunities within the travel and tourism industry as well as resource management systems at local, state, and federal levels

Minor concentrations are offered in Forest Management and Wood Utilization

FOREST MANAGEMENT

The Forest Management curriculum combines a broad education in the arts and sciences with the applied forest sciences This combination provides the necessary foundation for the scientific management of forest resources, products, and services

Because of the nature of their education, foresters are qualified for a broad spectrum of employment opportunities in both the public and private sectors They may be engaged as managers, administrators, or owners of forest lands or forest-based businesses; as technical specialists in the production of timber, useable water, wildlife, and esthetic values, and in the recreational use of the forest, or as professionals in other areas where the conservation of our natural resources is a matter of concern Foresters earning advanced degrees find employment in academic work and in research conducted both by public and private agencies

The undergraduate curriculum provides a strong program in the basic knowledge and skills required of a professional forester The curriculum is also designed to provide the necessary prerequisites for those students who desire to continue in graduate study The Department of Forestry offers graduate programs that lead to the Master of Science, Master of Forestry, and Doctor of Philosophy degrees

The Forest Management curriculum is accredited by the Society of American Foresters

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BOT 205 Plant Form and Function	4
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
FOR 101 Intro. to Forestry	1	FOR 103 Society, Conservation, and Forestry	2
Mathematics Requirement[1]	3	Mathematics Requirement[1]	3
Elective	3		
	17		16

SOPHOMORE YEAR

AGRON 202 Soils	4	FOR 206 Silvics	4
FOR 205 Dendrology	3	PHYS 200 Introductory Physics	4
Computer Science Requirement[2]	3	Business Requirement[2]	3
Literature Requirement[3]	3	Economics Requirement[2]	3
Elective	3	Social Science Requirement[4]	3
	16		17

FORESTRY SUMMER CAMP

FOR 251 Forest Plants	1
FOR 252 Forest Engineering	3
FOR 253 Forest Mensuration	4
FOR 254 Forest Products	1
	9

JUNIOR YEAR

ENGL 314 Technical Writing	3	ENGL 301 Public Speaking	3
FOR 304 Forest Economics	3	FOR 302 Forest Mensuration	3
FOR 306 Wood and Wood Fiber Identification	2	FOR 310 Silviculture	4
FOR 308 Aerial Photographs in Forestry	3	FOR 412 Forest Protection	2
Statistics Requirement[5]	3	FOR 420 Forest Products	3
Elective	3	Elective	2
	17		17

SENIOR YEAR

FOR 407 Forest Operations	3	FOR 409 Multiple-Use Forestry	2
FOR 413 Integrated Forest Pest Management	4	FOR 414 Forest Management Plans	2
FOR 416 Forest Policy and Admin.	2	FOR 415 Forest Wildlife Management	3
FOR 417 Forest Mgt. and Reg.	3	FOR 432 Forest Site Capability	2
FOR 418 Forest Valuation	3	Humanities Requirement[4]	3
Elective	2	Elective	5
	17		17

143 Total Semester Hours

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[1] A student with a College Board Mathematics Achievement Test, Level II score of 550 or greater may take MTHSC 106 to satisfy the Mathematics Requirement, otherwise, MTHSC 102 and 207 are required

[2] See adviser

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] See page 53

[5] EXST 301, MTHSC 203 or 301

WOOD UTILIZATION

The Wood Utilization curriculum combines a broad education in the sciences and humanities. Emphasis in the professional courses is placed on the properties and use of wood. Graduates are employed by wood-using industries and their suppliers, research laboratories, trade associations, and state and federal organizations.

The core curriculum allows for emphases in three areas of specialization: Wood Science, Wood Industries Management, and Forest Management. Wood Science deals with the properties and processing of wood, wood fiber, and products derived from wood. Wood Industries Management prepares students for the managerial aspects of forest products industries, including marketing and technical services. Twelve credit hours listed as emphasis areas in the core curriculum qualify a student as a participant in one of the two areas. The area of interest could be explored in more depth through use of the remaining elective credits.

Successful completion of the curriculum leads to a Bachelor of Science degree in Wood Utilization. Graduate studies leading to the Master of Science, Master of Forestry, and Doctor of Philosophy degrees are also offered.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BOT 205 Plant Form and Function	4
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
Mathematics Requirement[1]	3	FOR 103 Society, Conservation and Forestry	2
Elective	3	Mathematics Requirement[1]	3
	16		16

SOPHOMORE YEAR

FOR 205 Dendrology	3	FOR 222 Wood Properties II	3
FOR 221 Wood Properties I	3	PHYS 208 General Physics II	4
PHYS 207 General Physics I	4	Economics Elective[2]	3
Computer Science Elective[2]	3	Social Science Elective[4]	3
Literature Elective[3]	3	Elective	5
Elective	1		18
	17		

FORESTRY SUMMER CAMP

FOR 254 Forest Products	1
FOR 255 Secondary Wood Products	1
FOR 257 Forest Products Measurements	2
	4

JUNIOR YEAR

FOR 304 Forest Economics	3	ENGL 301 Public Speaking	3
FOR 306 Wood and Wood Fiber Identification	2	ENGL 314 Technical Writing	3
FOR 321 Drying and Machining of Wood	3	FOR 322 Wood Adhesives and Finishes	2
FOR 325 Chemical Aspects of Wood Utilization	3	FOR 323 Deterioration and Preserv of Wood	2
Emphasis Area Elective[6]	3	MGT 304 Statistical Quality Control	3
Statistics Elective[5]	3	Emphasis Area Elective[6]	5
	17		18

SENIOR YEAR

FOR 407 Forest Operations	3	FOR 409 Multiple Use Forestry	2
FOR 429 Wood Design	3	FOR 411 Harvest For. Prod	3
FOR 430 Composite Wood Materials	3	FOR 420 Forest Products	3
Emphasis Area Elective[6]	4	FOR 434 Foreign Woods	2
Elective	5	Humanities Elective[4]	3
	18	Elective	4
			17

141 Total Semester Hours

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[1] A student with a SAT Mathematics Achievement Test, Level II score of 550 or greater may take MTHSC 106 to satisfy the Mathematics Requirement, otherwise, MTHSC 102 and 207 are required

[2] To be selected in consultation with advisers

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] See page 53

[5] Select from EXST 301, MTHSC 203, 301

[6] Emphasis Areas are Wood Industries Management, Wood Science, and Forest Management Select one of these in consultation with adviser

PARKS, RECREATION, AND TOURISM MANAGEMENT

The curriculum in Parks, Recreation, and Tourism Management prepares students for a variety of careers in public and private leisure-service agencies. The undergraduate curriculum is designed to provide a broad exposure to the social, physical and biological sciences as well as to develop the basic knowledge and skills required to manage and administer leisure-service resources.

Flexibility within the curriculum is achieved by permitting the student to select coursework from among several emphasis areas that include Community Leisure Services, Recreation Resource Management, Therapeutic Recreation, and Travel and Tourism. The latitude in selection permits maximum accommodation of the individual student's interests and professional career objectives. Students may complete requirements for a minor appropriate to his/her emphasis area.

Graduate study leading to a Master of Parks, Recreation, and Tourism Management; Master of Science; and Doctor of Philosophy is offered.

The Parks, Recreation, and Tourism Management program is accredited by the National Council on Accreditation of the National Recreation and Parks Association.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab. I	1	BIOL 106 General Biology Lab. II	1
ENGL 101 Composition I	3	ENGL 102 Composition II	3
PRTM 101 Introduction to Leisure Services	3	PRTM 203 Personal and Community Health	3
History Requirement[1]	3	PRTM 205 Leisure Programs I	3
Mathematics Requirement[1]	3	Mathematics Requirement[1]	3
Elective	1	Elective	1
	17		17

SOPHOMORE YEAR

CPSC 120 Intro. to Info. Proc. Systems	3	ECON 200 Economic Concepts[3]	3
PRTM 102 Issues in Leisure Services	3	PRTM 207 Leisure Programs III	1
PRTM 206 Leisure Programs II	1	PRTM 311 Therapeutic Recreation	3
PSYCH 201 Introduction to Psychology	3	Humanities Requirement[1]	3
Literature Requirement[2]	3	Social Science Requirement[1]	3
Science Requirement[4]	4	Elective	3
	17		16

JUNIOR YEAR

PRTM 308 Leadership and Group Processes in Recreation	3	PRTM 321 Recreation Administration	3
PRTM 330 Intro. to Environmental Interpretation	3	Emphasis Area	8
Communication Requirement[1]	3	Elective	4
Emphasis Area	6		15
	15		

SUMMER

PRTM 405 Field Training in Recreation	8

SENIOR YEAR

PRTM 409 Meth of Recreation Research I	3	PRTM 410 Meth of Recreation Research II	3
Emphasis Area	9	Emphasis Area	9
Elective	3	Elective	3
	15		15

135 Total Semester Hours

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[1] See pages 52-53

[2] Select from ENGL 202 203 204 205, 206, 207 208 209

[3] The student may take ECON 211 and 212 with 3 (of the 6) credits allocated to electives

[4] Laboratory science courses (See adviser)

MINOR CONCENTRATIONS

Forest Management A minor in Forest Management requires credits from the following: FOR 305, 307, 310, 315, and a minimum of 6 credits, selected with a forestry faculty adviser's approval, from any forestry course (for a total of 15 credits).

Wood Utilization A minor in Wood Utilization requires 18 semester credits from the following: FOR 221, 307, 315, 420, and a minimum of 9 credits, selected with a forestry faculty adviser's approval, from 300- and 400-level forestry courses.

COLLEGE OF LIBERAL ARTS

The College of Liberal Arts, in addition to its seven major curricula leading to the degree of Bachelor of Arts, makes indispensible contributions to the programs of all other divisions of the University, including nearly all the instruction in the humanities and the social sciences. The College of Liberal Arts also offers programs leading to graduate degrees in English and History.

BACHELOR OF ARTS CURRICULUM

The curriculum leading to the degree of Bachelor of Arts is designed to meet the needs of students who desire a broad general education, with emphasis upon the humanities and the social sciences, as a preparation for intelligent citizenship, for general commercial and industrial life, for government service, and for teaching. This curriculum also provides excellent background for the study of law, journalism, or medicine.

As soon as feasible and not later than the end of the sophomore year, the student seeking the Bachelor of Arts degree will select a major and a minor field of concentration from the following areas (or a double major from the list of possible majors):

Majors

English
History
Modern Languages
Philosophy
Political Science
Psychology
Sociology

Minors

Accounting
American Studies
Biological Sciences
Chemistry
Psychology
Communications
Computer Science
Dramatic Arts
Economics
English
Fine Arts
Forest Management
Geography
Geology
History
International Studies
Marketing
Mathematical Sciences
Modern Languages
Music
Philosophy
Physics
Political Science
Psychology
Religion
Science and Technology in Society
Sociology
Spanish American Area Studies
Speech
Wood Utilization
Writing

To achieve depth as well as breadth in one's educational experience, a student selects a major concentration consisting of at least 24 semester hours from courses above the sophomore level. A student also chooses a minor concentration consisting of at least 15 additional semester hours. Courses satisfying the student's major concentration may not also be included in the minor. The minor field of study may be selected from the approved list of minors within the College of Liberal Arts and of minors outside the College. A second major concentration (a double major) may substitute for the minor providing all requirements are fulfilled for each major. A request for a double major outside the College of Liberal Arts must be initiated by the student's adviser and routed through the department head to the dean, who arranges the approval of the cooperating college's dean.

The total number of semester credits required for the degree is 130; of these, at least 12 credits must be earned in humanities courses numbered 300 or higher (MUS 210 excepted) and at least 12 credits in social science courses numbered 300 or higher. The humanities are for this purpose considered to include art and architectural history, English, languages, music, philosophy, and religion as well as courses entitled humanities; the social sciences are here considered to include anthropology, economics, geography, history, political science, psychology, and sociology.

Students in the Bachelor of Arts program who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education, such courses to be approved by their own department advisers.

BASIC CURRICULUM

FRESHMAN YEAR

First Semester		Second Semester	
ENGL 101 Composition I	3	ENGL 102 Composition II	3
HIST 172 Western Civilization	3	HIST 173 Western Civilization	3
MTHSC 101 Finite Probability[1]	3	MTHSC 102 Intro. to Math. Analysis[1]	3
Foreign Language	4	Same Foreign Language	4
Physical or Biological Science[2]	4	Physical or Biological Science[2]	4
	17		17

SOPHOMORE YEAR

Same Foreign Language	3	Same Foreign Language	3
Literature Requirement[3]	3	Literature Requirement[3]	3
Elective	12	Elective	10
	18		16

JUNIOR YEAR

Major and Minor Areas	9	Applied Science[4]	3
Composition and Speaking Skills[4]	3	Major and Minor Areas	12
Elective	3		15
	15		

SENIOR YEAR

Major and Minor Areas	9	Major and Minor Areas	9
Elective	8	Elective	6
	17		15

130 Total Semester Hours

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[1] Students may pursue alternate sequences such as the following MTHSC 101 and 106 or 203, 102 and 207, or 106 and 108, 207, 210, 301 308 Sociology majors must take either MTHSC 101 and 203 or 106 and 301

[2] A two-semester sequence of the same physical or biological science (astronomy, biology, chemistry, geology or physics) totaling at least 8 semester credits, including the appropriate laboratory course

[3] Select from ENGL 202, 203, 204 205, 206, 207, 208, 209

[4] See page 52-53

MAJOR CURRICULA IN THE COLLEGE OF LIBERAL ARTS

ENGLISH

The purposes of a major in English are to help students acquire an understanding of our literary heritage; develop an appreciation and practical knowledge of the modes of literary expression, research, and criticism; improve their ability to write effectively and intelligently; gain insights into literature as a humane study; and prepare for advanced work in English language, literature, and related disciplines.

The program of study for a major concentration in English consists of courses stipulated in the basic curriculum[1] for the Bachelor of Arts and 25 semester credits of English, arranged as follows:

Group I	ENGL 190 and 411.
Group II	Three credits from ENGL 405, 407, 408, 409, 410, 412, 413, 414.
Group III	Three credits from ENGL 406, 415, 416, 417, 418.
Group IV	Three credits from ENGL 422, 423, 424, 425.
Group V	Twelve additional credits from 300- and 400-level courses, at least 6 credits from the 400 level.[2]

The department requires proficiency in composition for all of its majors and minors. English majors or minors with writing problems must overcome them in the writing laboratory.

English majors must complete HIST 361, 363, and the third year of a foreign language or the second year of two foreign languages.

Electives are added as necessary to meet the minimum number of 130 credits for graduation.

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[1] The Department suggests that English majors take ENGL 203 and 204 or 207 and 208 to satisfy the sophomore literature requirement

[2] No course may be used toward the satisfaction of both major and minor requirements.

DEPARTMENTAL OFFERINGS

Because the English Department houses disciplines and courses often given separate departmental and course identity elsewhere, the following list of offerings will indicate the range and types of subjects bearing an English number in this catalog and in schedule booklets.

To find descriptions for all of the courses listed below, turn to page 238.

Freshman English ENGL 100, 101, H101, 102, H102.

Sophomore Literature ENGL 202, 203, H203, 204, H204, 205, H205, 206, H206, 207, 208, 209.

Literature ENGL 353, 356, 385, 386, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 422, 423, 424, 425, 426, 430, 431, 432, 435, 437, 455.

Advanced Writing ENGL 304, 312, 314, 345, 346, 347, 392, 445, 446, 447, 485, 490.

Linguistics ENGL 111, 217, 400, 401.

Journalism ENGL 231, 331, 333, 334, 335.
Special Topics ENGL 350, 351, 355, 357.
Dramatic Arts ENGL 170, 279, 375, 376, 377, 378, 475, 476, 477.
Speech ENGL 260, 301, 360, 361, 362, 363, 364, 366, 368, 369.

HISTORY

The recommended program of study consists of the required courses in the Bachelor of Arts curriculum and 30 additional credits in history, including at least two courses at the 400 level, selected with the advice and consent of a departmental adviser and arranged to suit the academic interests of the student. Additional electives are added as needed to meet the minimum of 130 semester credits required for graduation.

Prelaw students majoring in History should consult the departmental adviser for prelaw for a recommended program.

MODERN LANGUAGES

A student may elect a major concentration in a single language, a double major in two languages, or a double major combining a language major with a Bachelor or Arts major outside the department. All Modern Language majors will choose one of the following options:

Option A, designed to prepare the student to continue education in graduate school or to provide background for other professional language careers, requires the courses specified below plus 6 credits in history at the 300-400 level, selected with the approval of the Head of the Department of Languages.

Option B, designed to prepare for teaching in secondary schools, requires the courses specified below plus the coursework in education to meet certification requirements.

Option C, designed to prepare for a career in business. Modern Language majors seeking employment with multinational firms in the United States and overseas, or pursuing graduate degrees in international business studies, economics, or agricultural economics may have one of the following:

a) A double major with Economics.

b) A Cluster Minor in Administration.

c) A minor in Accounting, International Studies, or Spanish-American Area Studies.

All Modern Language majors must complete the stipulated courses in the basic Bachelor of Arts curriculum.

French All options require FR 205 and 209 plus 24 semester credits in French at the 300-400 level appropriate to the option and approved by the Head of the department.

German All options require 24 semester credits in German at the 300-400 level appropriate to the option and approved by the Head of the department.

Spanish All options require SPAN 303, 304, 305 or 306, 307, 308, 311, 409 and 9 additional credits at the 400 level.

Department requirements for all options: 3 credits from art and architectural history, music, or drama (practica with approval of department head).

PHILOSOPHY

The recommended course of study consists of the required courses in the Bachelor of Arts curriculum, one philosophy course at the 100 level (PHIL 101, 102 or 103), both PHIL 315 and 316, and 24 additional credits in philosophy courses numbered 300 or higher, including at least one 3-credit course at the 400 level, selected with the advice and consent of a departmental adviser and arranged to suit the academic interests of the student. Additional electives are added as needed to meet the minimum of 130 semester credits required for graduation.

POLITICAL SCIENCE

For a major concentration in Political Science, the recommended program of study consists of the required courses in the Bachelor of Arts curriculum; POSC 101, 201, 341, and 21 semester hours of political science drawn from at least four of these fields:

1. American Government—POSC 302, 403, 405, 406, 409, 442, 443, 444, 454.
2. Comparative Governments—POSC 371, 372, 373, 379, 475, 476.
3. International Relations—POSC 361, 462, 463, 465.
4. Political Thought—POSC 351, 352, 453.
5. Public Administration—POSC 321, 422, 423, 424, 425, 427, 428.
6. Public Law—POSC 432, 433, 434, 435.

With the department head's approval, POSC 300 and 482 may be appropriately applied to one of the six areas. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

PSYCHOLOGY

The recommended program of study for a major concentration in Psychology consists of the required courses in the Bachelor of Arts curriculum; PSYCH 201, 210, 310; and 24 additional credits in psychology including at least two courses at the 400 level and selected as follows.

At least one course from each of the following groups and 8 additional credits at the 300-400 level.

Group I	PSYCH 320-321, 322-323, 424-425.
Group II	PSYCH 330, 333, 415.
Group III	PSYCH 340, 343, 345.
Group IV	PSYCH 352, 355, 364.
Group V	PSYCH 370, 471, 483.

It is recommended that Psychology majors take MTHSC 101, 203, or 106, 108. Zoology 470 may be included in lieu of one 300- or 400-level elective psychology course.

SOCIOLOGY

The Sociology major consists of the required courses in the Bachelor of Arts curriculum (Sociology majors must take MTHSC 101 and 203 or 106 and 301), SOC 201, 404, SOC (RS) 303, and 24 credits from one of the following concentrations:

General Sociology Six hours from among SOC 350, 351, 460, and 461; 6 hours from among SOC 330, 331, 431, and SOC (RS) 371; and 12 hours from among all courses offered in the Department of Sociology not already taken to fulfill requirements.

Social Service Sociology SOC 380, 381, 382, and SOC (RS) 495; 9 hours from among SOC 310, 383, 392, 394, 395, 480, 481, and PSYCH 488; and one additional three-hour course from among all courses offered in the department.

Criminal Justice Sociology SOC 390, 393, 490, SOC (RS) 495; 9 hours from among SOC 351, 391, 392, 430, 460, HIST 496, POSC 434, 435, and one three-hour course from among all courses offered in the Department not taken above.

Community and Population Studies (Offered jointly with Rural Sociology) Twelve hours from among CAPL 411, SOC (RS) 359, 371, 401, 471; 9 hours from among CAPL 472, 473, CRD 357, CRD (AGEC) 411, 412, MTHSC 301, SOC 330, 331, 381, 431, SOC (RS) 403, and one three-hour course under the option requirements not already taken. (RS 301 may be substituted for SOC 201 by Community and Rural Development majors.)

At least 9 of the total hours in the major must be 400-level sociology and/or rural sociology courses. Additional electives are added as needed to meet the minimum of 130 semester credits required for graduation.

MINOR CONCENTRATIONS

Students seeking the Bachelor of Arts degree may choose one of any number of minor concentrations available. The requirements for each minor are detailed below.

Accounting A minor concentration in Accounting requires ACCT 201, 202, 301, 302, and 6 additional credits in accounting courses numbered higher than 201.

American Studies A minor concentration in American Studies requires AMST 300, 400 and two courses from each of the following groups:

Group I	ENGL 351, 353, 355, 357, 425, 455, HIST 306, 308, 314, 315, 400.
Group II	ANTH 320, ECON 421, ENGL 369, MUS 311, POSC 433, 453, 482, REL 310, RS 301, SOC 331, 460.

English majors seeking a minor concentration in American Studies must select history courses from Group I; History majors seeking a minor concentration in American Studies must select English courses from Group I. Courses may be substituted for the courses in Groups I and II only with the approval of the American Studies adviser. In addition, the American Studies adviser must approve the minor programs of all students seeking the minor concentration in American Studies.

Biological Science A minor concentration in Biological Science requires 15 semester credits in the biological sciences numbered higher than 200.

Chemistry A minor concentration in Chemistry requires CH 101, 102, and 15 additional credits in chemistry, the courses to be selected in consultation with the Department of Chemistry.

Cluster Minor This minor concentration is designed to allow students a somewhat wider choice of course materials than is possible with the conventional subject-matter minor. The general requirement for the Cluster Minor is 15 semester credits in courses numbered higher than 300, except where noted differently, chosen according to one of the plans listed below. Courses within the student's major area may not be included in the Cluster Minor.

Group I	Social Sciences—anthropology, economics, geography, history, political science, psychology, sociology.
Group II	Administration—accounting, economics, finance, management, law.
Group III	Life Sciences[1]—biochemistry, botany, genetics, microbiology, zoology.
Group IV	Physical Sciences[1]—chemistry, geology, physics.

Communications A minor concentration in communications requires 18 credits distributed as follows:

General Communications Option ENGL 231, 312, and either 360 or 361, PHIL 102; 6 elective credits.

Advertising Option AGEC 351, ENGL 231 or 304, GC 104, PSYCH 330; 6 elective credits.

Commerce Option AGEC 351 or INED 496, ENGL 231 or 304, 360 or 361, MGT 301; 6 elective credits.

Politics Option ENGL 312 and either 360 or 361, POSC 341, 443; 6 elective credits.

Elective credits are approved by the Head of the Department of English or his representative.

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[1] No course in the 100 series is acceptable toward the Cluster Minor and not more than two courses in the 200 series.

Computer Science A minor in Computer Science requires CPSC 110 or 120, 130, 210, 230, and two additional computer science courses numbered 300 or higher.

Dramatic Arts The minor concentration in Dramatic Arts requires ENGL 378 and 15 additional semester credits arranged as follows:

Group I Dramatic Literature—At least 3 credits from these courses: ENGL 404, 410, 411, 430.
Group II Production and Playwriting—9 credits from these courses: ENGL 347, 375, 376, 377, 447, 475, 476, 477.
Group III Electives—3 additional credits from the 400-level courses listed above.

Economics A minor concentration in Economics requires ECON 314, 407, and 9 additional credits from economics courses numbered 300 or higher.

English A minor concentration in English requires 15 semester credits in English above the sophomore level, arranged as follows:

Group I ENGL 411.
Group II Three credits from ENGL 405, 406, 407, 408, 409, 410, 412, 413, 414, 415, 416, 417, 418.
Group III Three credits from ENGL 422, 423, 424, 425.
Group IV Six additional credits above the sophomore level, including at least 3 credits from the 400-level.

Department certification of proficiency in composition is required. (See discussion under major concentration in English.)

Fine Arts The minor concentration in Fine Arts requires HUM 301[1], 302[1] and 15 semester credits from the following courses, of which at least 9 must be earned in courses numbered 300 or higher, and no more than 9 in any discipline selected: Art and Architectural History (all courses); ENGL 279, 345, 346, 357, 363, 375, 376, 378, 445, 446; HUM 305, 306, 309; LS 190; MUS 151, 152, 205, 206, 210, 251, 252, 301, 305, 306, 311, 315, 316, 351, 352, 362, 363, 365, 421, 422; Visual Arts (all courses).

Geography A minor in Geography requires GEOG 101 or 102 plus 15 additional hours of geography and selected courses at the 300-400 level, and at least one 400-level course from the following: GEOG 301, 302, 303, 401, PRTM 401, RS (SOC) 401, 471.

Geology A minor concentration in Geology requires GEOL 101 and 15 additional credits drawn from 300- and 400-level geology courses; at least one 400-level course must be included.

History A minor concentration in History requires 18 semester credits in history. These 18 credits may include HIST 172 or 173, but not both. At least one 400-level course must be included.

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[1] Students transferring from the College of Architecture may substitute CADS 151-152 for HUM 301-302

International Studies A minor concentration in International Studies requires the global perspectives core course, IS 201 and 15 additional credits at the 300-400 level as indicated below, and a minimum of 3 hours from each group as follows:

Group I	Economics, Political Science, and Sociology—ECON 404, 410, 412, POSC 361, 371, 373, 379, 462, 463, 465, 475, 476, SOC 311, 433.
Group II	Geography and History—GEOG 301, 302, 303, 401, HIST 330, 333, 341, 342, 382, 384, 386, 440, 492, 494.
Group III	Languages (French, German, and Spanish)—FR 305, 307, 316, 411, GER 305, 307, 411, 413, SPAN 305, 306, 307, 308, 414, 435, and study abroad courses.

Marketing A minor concentration in Marketing requires MKT 301; either HIST 306, POSC 443, PSYCH 364, or SOC 330; and 12 additional hours drawn from 400-level marketing courses.

Mathematical Sciences A minor concentration in Mathematical Sciences requires MTHSC 208, 301, and 9 additional credits in mathematical sciences courses numbered 300 or higher.

Modern Languages A minor concentration in Modern Languages requires 15 semester credits in one modern language from courses on the 300- and 400-levels, including at least one course on the 400 level. In addition, a minor concentration in French requires FR 205, and a minor concentration in Spanish requires SPAN 205.

Music A minor concentration in Music requires MUS 151, 152, 205, 206, two credits in ensemble (MUS 361, 362, 363, 365), and 11 additional credits from these courses: MUS 210, 251, 252, 301, 305, 306, 311, 315, 316, 351, 352, 421, 422. Two additional ensemble credits may be included.

Philosophy A minor concentration in Philosophy requires 18 semester credits in philosophy. These 18 credits may include one 100-level philosophy course (PHIL 101, 102, or 103). At least one 3-credit course at the 400-level must be included. REL 309 may be counted toward the minor.

Physics A minor concentration in Physics requires PHYS 122 and 15 additional semester credits in physics, including PHYS 221, 222.

Political Science A minor concentration in Political Science requires POSC 101, 201, and 15 additional semester credits selected from at least three of the fields of political science. At least one 400-level course must be included.

Psychology A minor concentration in Psychology requires PSYCH 201 and 205 or 210 (except for Sociology majors) and 15 semester credits from 300- and 400-level psychology courses. At least one 400-level course must be included.

Religion A minor concentration in Religion requires REL 101 plus 15 credits in religion courses numbered above 300, including at least one course numbered above 400. PHIL 303 and SOC 432 may be included in the minor, provided that they are not counted towards meeting requirements for a major or minors in those fields.

Science and Technology in Society A minor in Science and Technology in Society requires STS 300 plus 15 additional hours, at least six of which must be on the 400 level. No course that is used to meet the requirements of a disciplinary major may also be used to meet the Science and Technology in Society minor requirements. See adviser for list of approved courses.

Sociology A minor concentration in Sociology requires SOC 201 and 15 credits from sociology and rural sociology courses numbered 300 or higher. At least one 400-level course must be included.

Spanish-American Area Studies A minor concentration in Spanish-American Area Studies requires the equivalent of SPAN 202, plus 15 semester credits distributed as follows: 6 credits from HIST 340, 341, 342, 440; 6 credits from SPAN 305, 306, 308, 311; 3 credits from AGRIC 301, 401, ECON 410, POSC 475.

Speech A minor concentration in Speech requires 18 semester credits arranged as follows: ENGL 301; 3-6 credits from ENGL 360 or 361; 3-6 credits from ENGL 364, 365, or 369. At least 3 additional credits from ENGL 260, 362, 363, 366, 368, or any of the courses listed above.

Writing A minor concentration in writing requires 15 credits as follows:

Business and Technical Option AGEC 351 or GC 104, CPSC 120, ENGL 304 or 314, 392, 490.

Journalism Option ENGL 231, 333, 334, 335; one of the following electives: AGEC 351, CPSC 120, GC 104, ENGL 217, 260, 301, 304, 312, 314, INED 496, PHIL 102; any course approved by the Head of the English Department.

Writing Pedagogy Option ENGL 312, 400, 401, 485; elective (3 credits), any 300- or 400-level writing course offered by the English Department.

Creative Writing Options

Drama ENGL 347, 447 (6 credits), 430; one of the following electives: ENGL 312, 378, 410, 411.

Fiction ENGL 345, 445 (6 credits), 432; one of the following electives: ENGL 312, 418, 425, 426.

Poetry ENGL 346, 446 (6 credits), 431; one of the following electives: ENGL 312, 413, 416, 417.

COURSES NOT APPROVED FOR GRADUATION CREDIT IN THE COLLEGE OF LIBERAL ARTS

Students majoring in the College of Liberal Arts are not permitted to use ENGL 100, MTHSC 115, 116, 215, 216 as credit toward the number of hours needed for graduation.

COLLEGE OF NURSING

Clemson University College of Nursing provides baccalaureate and master's degree programs to prepare for careers in nursing. Opportunities within the College of Nursing and elsewhere in the University combine to provide a setting which enables students to fulfill a wide range of educational objectives. Each student enrolled in nursing is encouraged to recognize these opportunities and partake of them.

The four-year program leading to the Bachelor of Science in Nursing is designed to prepare students for the practice of professional nursing in a variety of settings, such as hospitals, industry, clinics, and public health agencies. This curriculum provides an unlimited opportunity for men and women to attain sound preparation for professional nursing and a foundation for graduate study in nursing. During the first two years, emphasis is upon liberal arts and basic science courses arranged sequentially to provide a foundation for the nursing major. In junior and senior years the emphasis is upon the study of nursing. However throughout the entire program, students are encouraged to enroll in courses outside their majors which can be taken simultaneously with the study of nursing.

Clinical nursing experiences under the guidance of the College of Nursing faculty take place with clients in multiple hospitals, clinics, and other health agencies. These community resources enable students of nursing to enjoy a variety of clinical facilities and assist faculty to provide quality clinical instruction.

ENTRANCE REQUIREMENTS

To facilitate admission of students who can achieve at an appropriate level in the program, admission is selective. Consideration is given to performance in secondary school and on the College Board Examination (SAT). Those seeking admission are advised to apply to the University early in the fall of the senior year in high school.

OTHER REQUIREMENTS

All students enrolled in the College of Nursing are required to carry throughout the period of clinical laboratory assignments a current and valid student nurse's professional liability insurance policy with minimum limits of liability of $200,000 per occurrence and $600,000 in aggregate and provide documentation thereof to the Dean of the College of Nursing. No student may participate in clinical learning activities without this insurance coverage.

BACHELOR OF SCIENCE IN NURSING

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
NURS 130 Introduction to Nursing	1	NURS 131 Intro. to Communication for Health Professionals	1
PSYCH 201 Introduction to Psychology	3	SOC 201 Introduction to Sociology	3
Mathematics Requirement[3]	3	Computer Technology Requirement[1]	3
	17		17

SOPHOMORE YEAR

NURS 210 Health Assessment	3	EXST 301 Introductory Statistics	3
NURS 230 Professionalism in Nursing I	2	or MTHSC 203 Elem. Stat. Inference	3
MICRO 205 Introductory Microbiology	4	NURS 211 Fund. Principles of Nursing	4
ZOOL 222 Human Anatomy	4	PSYCH 340 Life Span Dev. Psych.	3
Literature Requirement[2]	3	SOC 311 The Family	3
	16	ZOOL 223 Human Physiology	4
			17

JUNIOR YEAR

NURS 301 Nursing Care for the Childbearing Family	4	NURS 303 Adult Nursing I	7
NURS 302 Nursing Care of Children	4	NURS 304 Pathophysiology for Health Care Professionals	3
NURS 315 The Developing Family in the Community	4	NURS 316 Adult Nurs. in the Community	4
NURS 330 Professionalism in Nursing II	2	Humanities Requirement[1]	3
NUTR 451 Human Nutrition	3		17
	17		

SENIOR YEAR

NURS 401 Mental Health Nursing	4	NURS 403 Adult Nursing II	6
NURS 402 Long-Term Nursing Care	3	NURS 404 Nursing Management	3
NURS 415 Community Health Nursing	3	NURS 430 Professionalism in Nurs. III	2
Public Speaking Requirement[3]	3	Elective	6
Elective	4		17
	17		

135 Total Semester Hours

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[1] See adviser

[2] ENGL 202, 203, 204, 205, 206, 207, 208, 209

[3] See page 52

Notes

1. A minimum of C is required in nursing courses numbered 200 and above. Students may repeat a nursing course one time only.

2. A minimum of C is required in the following science courses for progression to junior year: BIOL 103, 104, CH 101, 102, MICRO 205, ZOOL 222, 223

COLLEGE OF SCIENCES

The College of Sciences, attuned to the times and its needs, offers ten major curricula leading to the degree of Bachelor of Science. These are Biochemistry, Biological Sciences, Chemistry, Computer Information Systems, Computer Science, Geology, Mathematical Sciences, Medical Technology, Microbiology, and Physics.

In addition, the Bachelor of Arts degree is offered with a major emphasis in Biological Sciences, Chemistry, Geology, Mathematical Sciences, and Physics.

Not only are the departments in the College of Sciences concerned with their own programs, but they work closely with the other academic departments in the University. This interweaving of the physical, mathematical and biological sciences with other disciplines, such as economics, engineering, management and others allows students great flexibility and responsibility in designing their own programs.

BACHELOR OF ARTS CURRICULA

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of those students who desire a broad general education. The first two years are spent in introductory work in several areas in order to give the student breadth of view. This background enables the student to select intelligently the major and minor fields of concentration. The major areas in the College of Sciences are Biological Sciences, Chemistry, Geology, Mathematical Sciences, and Physics.

A student has a large degree of flexibility and responsibility in designing the minor area from any departments in the University. All minors listed and described on pages 143-147 under the College of Liberal Arts are approved for this program as well as any of the natural sciences and mathematical sciences. The courses for these minors are to be selected in consultation with the appropriate department. The minor fields are as follows:

Accounting
American Studies
Biochemistry
Biological Sciences
Chemistry
Cluster Minor
Communications
Computer Science
Dramatic Arts
Economics
English
Fine Arts
Forest Management
Geography
Geology
History
International Studies
Marketing
Mathematical Sciences
Microbiology
Modern Languages
Music
Philosophy
Physics
Political Science
Psychology
Religion
Science and Technology in Society
Sociology
Spanish-American Area Studies
Speech
Wood Utilization
Writing

Note: No curriculum in the College of Sciences leading to the Bachelor of Arts degree will allow credit for ENGL 100 or MTHSC 105 to be used to satisfy requirements for graduation.

To fulfill requirements for a major concentration, a student takes 24 semester hours credit from courses above the sophomore level including or in addition to certain courses specified by the major department; the minor concentration requires 15 credits from courses above the sophomore level. In some major and minor disciplines, certain prescribed courses at the sophomore level are counted toward the 24 and 15 credit-hour requirements.

MAJOR FIELDS OF CONCENTRATION

BIOLOGICAL SCIENCES

The Bachelor of Arts in Biological Sciences provides a strong foundation in biology and is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin. of Biology I[1]	5	BIOL 111 Prin. of Biology II[1]	5
CH 101 General Chemistry	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
Foreign Language Requirement[2]	4	Foreign Language Requirement[2]	4
	16		16

SOPHOMORE YEAR

BIOSC 202 Animal Diversity[3]	4	BIOSC 201 Plant Diversity[3]	4
or BIOSC 201 Plant Diversity	4	or BIOSC 202 Animal Diversity	4
HIST 172 Western Civilization	3	HIST 173 Western Civilization	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
Foreign Language Requirement[2]	3	or MTHSC 301 Stat. Theory and Meth. I	3
Literature Requirement[4]	3	Foreign Language Requirement[2]	3
	17	Literature Requirement[4]	3
			16-17

JUNIOR YEAR

BIOCH 210 Elem. Biochemistry	4	ENGL 314 Technical Writing	3
PHYS 207 General Physics I	4	or ENGL 301 Public Speaking	3
Major[5]	4	PHIL 325 Philosophy of Science	3
Minor[6]	3	PHYS 208 General Physics II	4
Elective	3	Major[5]	4
	18	Minor[6]	3
			17

SENIOR YEAR

Major[5]	4	Major[5]	4
Minor[6]	6	Minor[6]	3
Elective	6	Elective	9
	16		16

132 Total Semester Hours

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[1] BIOL 110 and 111 are strongly recommended. However, BIOL 104/105 may substitute for BIOL 110 and BIOL 104/106 may substitute for BIOL 111. The remaining 1-2 hours required must be satisfied by completing 1-2 extra hours in major elective courses.

[2] Four semesters of the same language are required.

[3] BIOSC 201, 202 count toward the required 24 hours of the Biological Science major.

[4] ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[5] At least one course must be taken from each of 4 course areas: (1) Genetics and Evolution, (2) Ecology and Behavior, (3) Development and Cell Biology, and (4) Physiology.

[6] Minors, in addition to those listed under Bachelor of Arts Curricula in the College of Sciences, may be arranged in consultation with a departmental advisor.

CHEMISTRY

For the Bachelor of Arts degree, Chemistry requires 130 semester hours.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Calculus of One Variable I	4	MTHSC 108 Calculus of One Variable II	4
Modern Language[3]	4	Modern Language[3]	4
	15		15

SOPHOMORE YEAR

CH 223 Organic Chemistry[2]	3	CH 224 Organic Chemistry[2]	3
CH 227 Organic Chemistry Lab	1	CH 228 Organic Chemistry Lab	1
MTHSC 206 Cal. of Sev. Var.	4	HIST 172 Western Civilization	3
PHYS 122 Phys. with Cal. I	3	PHYS 221 Phys. with Cal. II	3
Literature Requirement[1]	3	Literature Requirement[1]	3
Modern Language[3]	3	Modern Language[3]	3
	17		16

JUNIOR YEAR

HIST 173 Western Civilization	3	Chemistry Elective	4
Chemistry Elective	4	Minor	6
Minor	3	Elective	6
Elective	7		16
	17		

SENIOR YEAR

Chemistry Elective	4	Chemistry Elective	4
Minor	3	Minor	3
Elective	10	Elective	10
	17		17

130 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] CH 223, 224 will count towards the 24 hours of the Chemistry major

[3] Four semesters of the same language are required

GEOLOGY

For the Bachelor of Arts degree, Geology requires 128 semester hours.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry*	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Calculus of One Variable I	4	MTHSC 108 Calculus of One Variable II	4
Modern Language[1]	4	Modern Language[1]	4
	15		15

SOPHOMORE YEAR

GEOL 101 Physical Geology	4	ENGL 314 Technical Writing	3
MTHSC 206 Cal. of Sev. Var.	4	GEOL 102 Historical Geology	4
Literature Requirement[2]	3	HIST 172 Western Civilization	3
Modern Language[1]	3	Modern Language[1]	3
Elective	3	Elective	4
	17		17

JUNIOR YEAR

GEOL 406 Mineralogy	3	GEOL 409 Petrology	3
HIST 173 Western Civilization	3	Geology Elective	3
Geology Elective	3	Humanities Elective	3
Humanities Elective	3	Minor	3
Minor	3	Elective	4
Elective	3		16
	18		

SENIOR YEAR

GEOL 402 Structural Geology	3	GEOL 404 Economic Geology	3
Geology Elective	3	Geology Elective	3
Minor	6	Minor	3
Social Science Elective	3	Social Science Elective	3
	15	Elective	3
			15

128 Total Semester Hours

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[1] Two years of the same language are required

[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

MATHEMATICAL SCIENCES

For a major concentration a recommended program of study is shown below, with 130 semester hours required for graduation

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem Comp Programming	3	ECON 200 Economic Concepts	3
ENGL 101 Composition I	3	or ECON 211 Principles of Economics	3
HIST 172 Western Civilization	3	ENGL 102 Composition II	3
MTHSC 106 Cal of One Var I	4	HIST 173 Western Civilization	3
Foreign Language[1]	4	MTHSC 108 Cal of One Var II	4
	17	Foreign Language[1]	4
			17

SOPHOMORE YEAR

MTHSC 206 Cal of Several Var	4	MTHSC 208 Intro to Ord Diff Equa	4
MTHSC 250 Introduction to Mathematical Sciences	1	MTHSC 311 Linear Algebra	3
Foreign Language[1]	3	Foreign Language[1]	3
Literature Requirement[2]	3	Literature Requirement[2]	3
Natural Science Requirement[3]	4	Natural Science Requirement[3]	4
	15		17

JUNIOR YEAR

CAAH 303 or 304 Evol of Vis Arts	3	MTHSC 401 Statistical Methodology	3
or MUS 210 Music Appreciation	3	MTHSC 412 Intro to Mod Alg	3
ENGL 301 Public Speaking	3	or MTHSC 419 Discrete Math Structures I	3
or ENGL 314 Technical Writing	3	Minor	3
MTHSC 400 Theory of Probability	3	Social Science Requirement[3]	3
Minor	3	Elective	5
Social Science Requirement[3]	3		17
Elective	2		
	17		

SENIOR YEAR

MTHSC 440 Linear Programming	3	MTHSC 454 Adv Calculus II	3
or MTHSC 450 Intro to Math Models	3	or MTHSC 464 Math Analysis II	3
MTHSC 453 Advanced Calculus I	3	Humanities Requirement[3]	3
or MTHSC 463 Math Analysis I	3	Mathematical Sciences Requirement[4]	3
Minor	6	Minor	3
Elective	3	Elective[3]	3
	15		15

130 Total Semester Hours

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[1] Four semesters of the same language
[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209
[3] Must be approved by adviser
[4] Select from 300- and 400-level mathematical science courses with approval of adviser

PHYSICS

For a major concentration a recommended program of study is shown below, with 129 semester hours required for graduation.

The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of science.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
HIST 172 Western Civilization[1]	3	HIST 173 Western Civilization[1]	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
PHYS 101 Current Topics in Modern Physics	1	PHYS 122 Phys. with Cal. I	3
		PHYS 124 Physics Lab. I	1
	15		18

SOPHOMORE YEAR

MTHSC 206 Calculus of Sev. Var.	4	MTHSC 208 Intro. to Ord. Diff. Equa.	4
PHYS 221 Physics with Cal. II	3	PHYS 222 Physics with Cal. III	3
PHYS 223 Physics Lab. II	1	PHYS 224 Physics Lab. III	1
Literature Requirement[2]	3	Literature Requirement[2]	3
Modern Language[1]	4	Modern Language[1]	4
Elective	1		15
	16		

JUNIOR YEAR

E&CE (PHYS) 340 Electromagnetics I	2	E&CE (PHYS) 341 Electromagnetics II	2
PHYS 321 Mechanics I	3	PHYS 322 Mechanics II	3
English (as approved)[3]	3	Humanities Requirement[4]	3
Humanities Requirement[4]	3	Minor	3
Minor	3	Modern Language[1]	3
Modern Language[1]	3	Elective	3
	17		17

SENIOR YEAR

PHYS 455 Quantum Physics I	3	Minor	3
Minor	6	Physics (as approved)	3
Physics (as approved)	4	Social Science Requirement[4]	3
Social Science Requirement[4]	3	Elective	6
	16		15

129 Total Semester Hours

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[1] Modern Language may be taken before history
[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209
[3] Select from approved English courses in advanced writing or public speaking
[4] See page 53.

BACHELOR OF SCIENCE CURRICULA

BIOCHEMISTRY

Biochemistry is the study of the molecular basis of life In order to comprehend current biochemical information and to make future contributions to our molecular understanding of life processes, the student must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics, the biochemistry curriculum is built upon this concept

The program provides an excellent educational background for professional school (e g , medicine, dentistry, or veterinary medicine) and graduate school in biochemistry or another biological science discipline

The graduate will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin of Biology I	5	BIOL 111 Prin of Biology II	5
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal of One Var I	4	MTHSC 108 Cal of One Var II	4
	16		16

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	BIOCH 301 General Biochemistry	3
CH 227 Organic Chemistry Lab [1]	1	CH 224 Organic Chemistry	3
MICRO 305 General Microbiology	4	CH 228 Organic Chemistry Lab [1]	1
MTHSC 206 Calculus of Sev Var	4	PHYS 221 Phys with Cal II	3
PHYS 122 Phys with Cal I	3	PHYS 223 Physics Lab II	1
Literature Requirement[2]	3	Literature Requirement[2]	3
	18	Approved Elective[3]	3
			17

JUNIOR YEAR

BIOCH 425 Gen Biochemistry Lab	1	BIOCH 426 Gen Biochemistry Lab	1
BIOCH 431 Phys Approach to Bioch	3	BIOCH 432 Biochemistry of Metabolism	3
CH 331 Physical Chemistry	3	CH 332 Physical Chemistry	3
CH 339 Physical Chemistry Lab	1	CH 340 Physical Chemistry Lab	1
PHYS 222 Phys with Cal III	3	Science Requirement[4]	3
Science Requirement[4]	3	Approved Elective[3]	6
Elective	3		17
	17		

SENIOR YEAR

BIOCH 491 Special Problems in Bioch	3	BIOCH 491 Special Problems in Bioch	3
or Science Requirement[4]	3	or Science Requirement[4]	3
CH 313 Quantitative Analysis	3	Approved Elective[3]	6
CH 317 Quantitative Anal Lab	1	Elective	7
ENGL 301 Public Speaking	3		16
or ENGL 314 Technical Writing	3		
Approved Elective[3]	7		
	17		

134 Total Semester Hours

Note No curriculum in the College of Sciences leading to the Bachelor of Science degree will allow credit for ENGL 100 or MTHSC 105 to be used to satisfy the requirements for graduation

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[1] CH 225 may be substituted for CH 227, and CH 226 may substitute for CH 228 In both cases, the additional hour of credit counts toward a science elective or can replace PHYS 223

[2] Select from ENGL 202, 203, 204, 205, 206, 207 208, 209

[3] At least 18 hours must be elected from the humanities and/or social sciences Of these, a minimum of 6 must be in the social sciences to be selected from anthropology, economics, geography, history, political science, psychology, or sociology A one-year sequence from the following is strongly recommended FR 101, 102, GER 101, 102, or RUSS 101, 102 Ten hours of aerospace studies or military science may be counted as approved electives

[4] Select Approved Electives from botany, chemistry computer science genetics, mathematics, microbiology, physics, plant pathology zoology, or as approved by the adviser in consultation with the Biochemistry faculty At least one semester of BIOCH 491 is required

BIOLOGICAL SCIENCES

Biology encompasses the broad spectrum of the modern life sciences, including the study of all aspects of life from the structure and function of the whole organism down to the subcellular levels and up through the interactions of organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are explored through the hierarchy of the organization of life. Applications of current advances to the health and well-being of man and his society, to nature and the continuation of earth as a balanced ecosystem, and to an appreciation of the place of natural science in our cultural heritage receive emphasis.

Majors in Biological Sciences receive classroom, laboratory, and field training in biology with an emphasis on chemistry, mathematics, and physics as necessary tools. The Bachelor of Science in Biological Sciences curriculum prepares students for graduate study in any of the life science areas (such as agricultural sciences, biochemistry, botany, cell and molecular biology, conservation, ecology and environmental science, entomology, forestry, genetics, industrial and regulatory biology, microbiology, morphology, physiology, wildlife biology, and zoology, among others), for the health professions (medicine, dentistry, etc.), veterinary medicine, and for science teaching.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prin. of Biology I[1]	5	BIOL 111 Prin of Biology II[1]	5
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var I	4	MTHSC 108 Cal. of One Var. II	4
	16		16

SOPHOMORE YEAR

BIOSC 202 Animal Diversity	4	BIOSC 201 Plant Diversity	4
or BIOSC 201 Plant Diversity	4	or BIOSC 202 Animal Diversity	4
CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 227 Organic Chemistry Lab.	1	PHIL 325 Philosophy of Science	3
Literature Requirement[2]	3	Social Science Requirement[5]	3
Approved Elective[3]	3	Approved Elective[3]	3
Elective	3		16
	17		

JUNIOR YEAR

BIOCH 301 General Biochemistry	3	ENGL 314 Technical Writing	3
BIOCH 302 Mol. Bio. Lab.[4]	1	or ENGL 301 Public Speaking	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
or PHYS 122 Phys. with Cal. I	3	or PHYS 221 Physics with Cal. II	3
and PHYS 124 Physics Lab I[6]	1	and PHYS 223 Physics Lab. II	1
Major[7]	6	Major[7]	7
Social Science Requirement[5]	3	Elective	3
	17		17

SENIOR YEAR

Major[7]	12	Major[7]	12
Elective	6	Elective	6
	18		18

135 Total Semester Hours

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[1] BIOL 110 and 111 are strongly recommended. However, BIOL 103-105 may substitute for BIOL 110 and BIOL 104-106 may substitute for BIOL 111; the remaining 1-2 hours required must be satisfied by completing 1-2 extra hours in major elective courses.

[2] To be selected from sophomore literature courses (200 level only).

[3] Approved electives are selected in consultation with an adviser to complement the student's curriculum.

[4] CH 228 may be substituted for BIOCH 302.

[5] To be selected from course offerings in social sciences (geography, economics, history, political science, psychology, and sociology).

[6] Physics with calculus is a three semester sequence. Students selecting this option may wish to take PHYS 222-224 in the senior year to complete the sequence.

[7] At least one course must be taken from each of 4 course areas: (1) Genetics and Evolution, (2) Ecology and Behavior, (3) Development and Cell Biology, and (4) Physiology. The remaining courses may be selected from among the departmental course offerings at the 300-level or above.

CHEMISTRY

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community are open to the student whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides each student an opportunity to select a coherent program of study beyond the basic courses suited to his or her needs. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 112 General Chemistry	4
CH 141 Chemistry Orientation	1	CH 205 Intro to Inorganic Chemistry	2
CPSC 110 Elementary Computer Programming	3	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 108 Cal of One Var II	4
MTHSC 106 Cal of One Var I	4	PHYS 122 Phys with Cal I	3
	15		16

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 225 Organic Chemistry Lab	2	CH 226 Organic Chemistry Lab	2
MTHSC 206 Calculus of Sev Var	4	MTHSC 208 Intro to Ord Diff Equa	4
PHYS 221 Phys with Cal II	3	PHYS 222 Phys with Cal III	3
PHYS 223 Physics Lab II	1	PHYS 224 Physics Lab III	1
Foreign Language[1]	4	Foreign Language[1]	4
	17		17

JUNIOR YEAR

CH 313 Quantitative Analysis	3	CH 332 Physical Chemistry	3
CH 315 Quantitative Anal Lab	2	CH 340 Physical Chemistry Lab	1
CH 331 Physical Chemistry	3	CH 411 Instrumental Analysis	4
CH 339 Physical Chemistry Lab	1	ENGL 314 Technical Writing	3
Literature Requirement[2]	3	Elective[3]	5
Elective[3]	3		16
	15		

SENIOR YEAR

CH 402 Inorganic Chemistry	3	Chemistry Elective[4]	4
CH 443 Research Problems	3	Elective	13
Chemistry Elective[4]	3		17
Elective[3]	8		
	17		

130 Total Semester Hours

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[1] One year of German, French, or Russian
[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209
[3] At least 3 hours must be in humanities and 6 hours in social sciences
[4] CH 421 and 435 are recommended for students qualified for graduate studies

COMPUTER INFORMATION SYSTEMS

The Computer Information Systems degree program is oriented toward computer applications in management-related problems. The program emphasizes functional areas of management including accounting, production, marketing, and finance, and the applications of computers in these areas. The curriculum is designed to prepare students for careers in areas such as systems design and analysis, applications programming, database administration and information retrieval as well as for continued study toward an advanced degree.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 101 Computer Science I	4	CPSC 102 Computer Science II	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
Natural Science[1]	4	Humanities-Social Science[2]	3
	15	Natural Science[1]	4
			18

SOPHOMORE YEAR

CPSC 240 Intro to Data Structures	3	ACCT 203 Financial Accounting	3
ECON 211 Principles of Economics	3	CPSC 260 Prod Systems Environment	3
MTHSC 219 Intro to Discrete Methods	3	MGT 301 Principles of Management	3
Literature Requirement[1]	3	MTHSC 210 Applied Matrix Algebra	3
Natural Science[1]	3	or MTHSC 311 Linear Algebra	3
	15	Literature Requirement[3]	3
			15

JUNIOR YEAR

ACCT 307 Managerial Accounting	3	CPSC 332 Computer Systems	3
CPSC 230 Assembly Language Program	3	CPSC 462 Database Mgt Systems	3
CPSC 360 Periph and File Design	3	ENGL 304 Business Writing	3
ENGL 301 Public Speaking	3	or ENGL 314 Technical Writing	3
MTHSC 301 Stat Theory and Meth I	3	MGT 400 Mgt of Org Behavior	3
Elective	2	or MGT 416 Mgt of Hum Res	3
	17	MKT 301 Principles of Marketing	3
		Elective	2
			17

SENIOR YEAR

CPSC 371 Systems Analysis	3	CPSC 472 Software Dev Methodology	3
CPSC 463 Online Systems	3	MGT 402 Prod and Operations Mgt I	3
CPSC 491 Senior Seminar in Comp Sci	1	Computer Science Requirement[5]	3
FIN 306 Corporation Finance	3	Humanities-Social Science[2]	3
Humanities-Social Science Requirement[2]	3	Elective	4
Management Science Requirement[4]	3		16
Elective	2		
	18		

131 Total Semester Hours

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[1] Must include one of the following sequence BIOL 103 104 105 106 CH 101 102 or 112 PHYS 122 124 221 222 PHYS 207 208

[2] Select from the departmental list of approved humanities-social science courses and must include PSYCH 201

[3] Select from ENGL 202 203 204 205 206 207 208 209

[4] Select from MASC 312 413 MKT 432

[5] Select from any 400-level computer science course except CPSC 422

Notes

1 For graduation a candidate for the BS degree in Computer Information Systems will be required to have a 2.0 or higher cumulative grade-point ratio in the following 38 hours of courses (a) the 11 required courses taught by the computer science department and (b) the approved computer science requirement The candidate must earn a grade of C or better in each required 300-level or below computer science course

2 A grade of C or better must be earned in all prerequisite courses before enrolling in the next computer science course

COMPUTER SCIENCE

The Computer Science degree program is oriented toward design, implementation, and application of computer software systems to solve information processing problems in general. An "applications emphasis" in an area outside of computer science allows the program to be tailored to the needs and interests of individual students. This curriculum is more technically oriented than the Computer Information Systems curriculum, and it prepares a student for employment in the computer software field or for continued study toward an advanced degree in computer science.

This program has been accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 101 Computer Science I	4	CPSC 102 Computer Science II	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal of One Var I	4	MTHSC 108 Cal of One Var II	4
Natural Science[1]	4	Humanities-Social Science[2]	3
	15	Natural Science[1]	4
			18

SOPHOMORE YEAR

CPSC 240 Intro. to Data Structures	3	CPSC 230 Assembly Lang Prog	3
ECON 211 Principles of Economics	3	CPSC 260 Production Sys Environ	3
MTHSC 219 Intro to Discrete Meth	3	MTHSC 311 Linear Algebra	3
Literature Requirement[3]	3	Literature Requirement[3]	3
Natural Science[1]	4	Natural Science[1]	3
	16		15

JUNIOR YEAR

CPSC 330 Computer Systems Org	4	CPSC 422 Systems Programming	3
CPSC 360 Periph and File Design	3	ENGL 304 Business Writing	3
ENGL 301 Public Speaking	3	or ENGL 314 Technical Writing	3
MTHSC 301 Stat Theory and Meth. I	3	Applications Emphasis[4]	3
Applications Emphasis[4]	3	Computer Science Requirement[5]	3
	16	Decision Science Requirement[6]	3
		Humanities-Social Science[2]	3
			18

SENIOR YEAR

CPSC 428 Design and Impl. of Prog Languages	3	Applications Emphasis[4]	3
CPSC 491 Senior Seminar in Comp Sci	1	Computer Science Requirement[5]	6
Applications Emphasis[4]	3	Elective	7
Commerce Requirement[7]	3		16
Computer Science Requirement[5]	3		
Elective	4		
	17		

131 Total Semester Hours

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[1] Must include one of the following sequences. BIOL 103, 104, 105, 106, CH 101, 102 or 112, PHYS 122, 124, 221, 223

[2] Select from the departmental list of approved humanities-social sciences courses Must include 3 hours from anthropology, geography, history, political science, psychology or sociology

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[4] An application emphasis consists of 12 hours of related courses in an applications area as specified by the department.

[5] Must be approved and include two of the following: CPSC 423, 429, 462, 472

[6] Select from MTHSC 400, 405, 440

[7] Select from ACCT 203, MGT 301, LAW 312

Notes:

1 For graduation, a candidate for the BS degree in Computer Science will be required to have a 2.0 or higher cumulative grade-point ratio in the following 42 hours of courses: (a) all required courses taught by the Computer Science Department, and (b) the four approved computer science electives. The candidate must also have earned a grade of C or better in each course of category (a) above

2 A grade of C or better must be earned in all prerequisite courses before enrolling in the next computer science course.

GEOLOGY

Geology is a relatively young science. The word itself is only about 200 years old. It means the science of the earth. Such a science must be involved with the physics and chemistry of materials which comprise the earth, but equally important it must consider the development of life on earth. Fundamentally, the chemical, physical and biological responses to various environments on and in the earth must be thoroughly understood so that the historical development of the earth may be deduced, predictions of the future inferred, and natural resources intelligently developed.

Industry in our modern civilization is dependent on minerals and rocks. Metals have their origin in them as do our chief power sources, coal, petroleum, and radioactive minerals. The power and wealth of nations depend largely on their exploration, control and development of mineral wealth.

Geologists today are entering upon a new era. Widening horizons are indicated by employment not only in mineral-producing industries but by railroads, municipalities, engineering firms, and water authorities. For this reason, it is important that the geologist's education rest on a broad yet rigorous base.

This curriculum provides the student with the fundamentals in the geological sciences and excellent support in the other basic sciences. On successful completion of the Bachelor of Science program the student should be adequately prepared for employment or for graduate study in any field of geology.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 102 or 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
Modern Language[2]	4	Modern Language[2]	4
	15		15

SOPHOMORE YEAR

GEOL 101 Physical Geology	4	ENGL 314 Technical Writing	3
HIST 172 Western Civilization	3	GEOL 102 Historical Geology	4
MTHSC 206 Calculus of Sev. Var.	4	HIST 173 Western Civilization	3
Literature Requirement[1]	3	PHYS 122 Phys. with Cal. I	3
Modern Language[2]	3	Modern Language[2]	3
	17		16

JUNIOR YEAR

BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab. I	1	BIOL 106 General Biology Lab. II	1
GEOL 406 Mineralogy	3	EXST 301 Introductory Statistics	3
PHYS 221 Phys. with Cal. II	3	GEOL 409 Petrology	3
PHYS 223 Physics Lab. II	1	GEOL 413 Stratigraphy and Sed.	3
Elective[3]	4	PHYS 222 Phys. with Cal. III	3
	15	PHYS 224 Physics Lab. III	1
			17

Summer Geology Field Course[4] 6

SENIOR YEAR

GEOL 402 Structural Geology	3	GEOL 404 Economic Geology	3
GEOL 403 Invert. Paleontology	3	GEOL 410 Optical Mineralogy	3
Elective[3]	11	Elective	10
	17		16

134 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2] German or French is recommended. Two years in the same language are required.

[3] At least 12 hours must be elected from the humanities and/or social sciences with at least 3 in humanities and 3 in social sciences. See page 55.

[4] Clemson University does not conduct a field course in geology, but attendance at a course approved by the geology staff is required.

MATHEMATICAL SCIENCES

The Mathematical Sciences curriculum, carefully designed to possess a high degree of versatility, equips the student with the knowledge of mathematical concepts and methods that are applicable in the areas of physics, computer science, communication theory, data processing, statistics, operations research, economics, or any branch of the physical sciences in which a strong mathematical background is desired. In addition to containing the basic courses which provide the student with the mathematical skills necessary in the use of mathematics as it relates to other fields of knowledge, the curriculum allows the student in his junior year to select one of six optional sets of courses, providing an introduction to an area where mathematics is applied. These options are Actuarial Science, Applied Analysis, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing the student to cope with the dynamics of any mathematical environment, the curriculum seeks to provide an adequate background for the student who plans to pursue graduate study in mathematics or to fill many interesting positions in space research, computer development, business, or government research. Those electing the Biology option will have the necessary preparation for entering medical school.

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem Comp Prog	3	ECON 200 Economic Concepts	3
ENGL 101 Composition I	3	or ECON 211 Principles of Economics	3
HIST 172 or 173 Western Civilization	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var I	4	MTHSC 108 Cal of One Var II	4
Foreign Language[1]	4	Foreign Language[1]	4
	17	Elective[2]	3
			17

SOPHOMORE YEAR

MTHSC 206 Calculus of Sev Var	4	MTHSC 208 Intro. to Ord. Diff. Equa.	4
MTHSC 250 Intro. to Math. Science	1	MTHSC 311 Linear Algebra	3
MTHSC 360 Inter Math. Computing	3	PHYS 122 Phys. with Cal. I	3
Literature Requirement[3]	3	Literature Requirement[3]	3
Science[4]	4	Science[4]	4
	15		17

JUNIOR YEAR

MTHSC 400 Theory of Probability	3	MTHSC 401 Statistical Methodology	3
MTHSC 440 Linear Programming	3	MTHSC 412 Intro. to Modern Algebra	3
Option	3	or MTHSC 419 Dis. Math. Struc. I	3
Science[4]	4-3	Option	3
Elective[2]	3-4	Science[4]	4-3
	16	Elective[2]	3-4
			16

SENIOR YEAR

ENGL 301 Public Speaking	3	MTHSC 454 Advanced Calculus II	3
or ENGL 314 Technical Writing	3	or MTHSC 464 Math. Analysis II	3
MTHSC 450 Intro. to Math. Models	3	Option	3
MTHSC 453 Advanced Calculus I	3	Elective	10
or MTHSC 463 Math. Analysis I	3		16
Option	3		
Elective[2]	4		
	16		

130 Total Semester Hours

OPTIONS

Actuarial Science

MTHSC 231 Math of Life Insurance	3
MTHSC 232 Actuarial Science Seminar I	1
MTHSC 403 Intro. to Statistical Theory	3
MTHSC 407 Regress. and Time Series Analysis	3
MTHSC 432 Actuarial Science Seminar II	1
MTHSC 441 Intro. to Stochastic Models	3
	14

Operations Research/Management Science[6]

IE 482 Systems Modeling	3
or IE 484 Engr. Econ. Analysis	3
IE 486 Production Planning and Control	3
or MGT 402 Prod. and Op. Mgt. I	3
MTHSC 407 Regress. and Time Series Analysis	3
MTHSC 441 Intro. to Stochastic Models	3
MTHSC 460 Intro. to Numerical Analysis I	3
	15

Applied Analysis

Applications Area[5]	6
Two of the following courses:	
MTHSC 425 Orthogonal Functions and Boundary Value Problems	3
MTHSC 435 Complex Variables	3
MTHSC 460 Intro. to Numerical Analysis I	3
	12

Statistics

MASC 414 Statistical Analysis	3
MTHSC 403 Intro. to Statistical Theory	3
MTHSC 406 Sampling Theory and Meth.	3
MTHSC 407 Regress. and Time-Series Analysis	3
	12

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[1] Eight semester hours in the same language are required.

[2] These electives must be approved by the adviser.

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[4] Must include two of the following sequences: BIOL 103, 104, 105, 106; CH 101, 102, or 112; ECON 314, MASC (ECON) 311; PHYS 221, 222, 223, 224.

[5] These courses must be approved by the adviser. Possibilities include CH 331, 332; EM 320; MTHSC 457, 458; PHYS 321, 322; and E&CE (PHYS) 340, 341; ME 302.

[6] Select the following sequence: ECON 314, MASC (ECON) 311.

MATHEMATICAL SCIENCES—BIOLOGY OPTION

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I[1]	5	BIOL 111 Principles of Biology II[1]	5
CPSC 110 Elem. Comp. Prog.	3	ECON 211 Prin. of Economics	3
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I	4	MTHSC 108 Cal. of One Var. II	4
	15	MTHSC 250 Intro. to Math. Sci.	1
			16

SOPHOMORE YEAR

CH 101 General Chemistry	4	CH 112 General Chemistry	4
MTHSC 206 Calculus of Sev. Var.	4	MTHSC 208 Intro. to Ord. Diff. Eqns.	4
MTHSC 360 Inter. Math. Computing	3	MTHSC 311 Linear Algebra	3
PHYS 207 General Physics I	4	PHYS 208 General Physics II	4
Literature Requirement[3]	3	Literature Requirement[3]	3
	18		18

JUNIOR YEAR

CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 227 Organic Chemistry Lab	1	CH 228 Organic Chemistry Lab	1
MTHSC 400 Theory of Probability	3	MTHSC 401 Statistical Methodology	3
MTHSC 440 Linear Programming	3	MTHSC 412 Intro. to Mod. Alg. or MTHSC 419 Discrete Math. Structures I	3
Foreign Language[1]	4	Foreign Language[1]	4
Elective	2	Elective	2
	16		16

SENIOR YEAR

BIOSC 201 Plant Diversity	4	ENGL 301 Public Speaking	3
or BIOSC 202 Animal Diver	4	or ENGL 314 Technical Writing	3
MTHSC 450 Intro to Math. Models	3	HIST 172 or 173 Western Civilization	3
MTHSC 453 Advanced Cal I	3	MTHSC 454 Adv Calculus II	3
or MTHSC 463 Math Analysis I	3	or MTHSC 464 Math. Analysis II	3
Elective	6	Biological Science Elective[4]	4-3
	16	Elective[5]	2-3
			15

130 Total Semester Hours

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[1] Those qualifying for advance placement in languages or wanting to take languages the freshman year may take them in place of these courses

[2] Select from ENGL 202, 203, 204, 205, 206, 207 208 209

[3] In the same language

[4] Select from BIOCH 301 BOT 441 GEN 302 MICRO 305 or any 300- and 400-level zoology course

[5] Electives must be approved by adviser

MATHEMATICAL SCIENCES—COMPUTER SCIENCE OPTION

FRESHMAN YEAR

First Semester		Second Semester	
CPSC 110 Elem Comp. Prog[6]	3	ECON 200 Economic Concepts	3
ENGL 101 Composition I	3	or ECON 211 Principles of Economics	3
HIST 172 or 173 Western Civilization	3	ENGL 102 Composition II	3
MTHSC 106 Cal of One Var I	4	MTHSC 108 Cal of One Var II	4
Foreign Language[1]	4	Foreign Language[1]	3
	17	Elective[6]	3
			17

SOPHOMORE YEAR

CPSC 210 Programming Methodology[6]	4	CPSC 230 Assembly Lang Prog	3
MTHSC 206 Cal of Several Variables	4	MTHSC 208 Intro. to Ord Diff. Equa	4
MTHSC 250 Intro to Math. Science	1	MTHSC 311 Linear Algebra	3
Literature Requirement[3]	3	Literature Requirement[3]	3
Science Requirement[4]	4	Science Requirement[4]	4
	16		17

JUNIOR YEAR

MTHSC 360 Inter Math Comp	3	ENGL 301 Public Speaking	3
MTHSC 400 Theory of Probability	3	or ENGL 314 Technical Writing	3
MTHSC 440 Linear Programming	3	MTHSC 401 Statistical Methodology	3
PHYS 122 Phys. with Cal. I	3	MTHSC 412 Intro. to Mod. Alg	3
Science Requirement[4]	3-4	or MTHSC 419 Dis. Math. Struc. I	3
	15-16	Computer Science Requirement[5]	4-3
		Science Requirement[4]	3-4
			15-16

SENIOR YEAR

MTHSC 450 Intro. to Math. Models	3	MTHSC 454 Advanced Calculus II	3
MTHSC 453 Advanced Calculus I	3	or MTHSC 464 Math. Analysis II	3
or MTHSC 463 Math. Analysis I	3	Computer Science Requirement[5]	3
MTHSC 460 Intro. to Numerical Analysis I	3	Elective	10
Elective[2]	7-9		16
	16-18		

130 Total Semester Hours

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[1] Eight semester hours in the same language are required.

[2] These electives must be approved by the adviser

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[4] Must include two of the following sequences: BIOL 103, 104, 105, 106; CH 101, 102 or 112; ECON 314, MASC (ECON) 311; PHYS 221, 222, 223, 224.

[5] Select from CPSC 240 or from 300- and 400-level computer science courses or mathematical sciences computing courses.

[6] Students may pursue alternate sequence: CPSC 101, 102, 150.

MEDICAL TECHNOLOGY

Medical technology is the area of health care in which analyses are performed on human body fluids in order to detect disease conditions. The medical technologist in a modern hospital laboratory must know how to perform and evaluate tests made in several broad disciplines, which include clinical chemistry, clinical microbiology, immunohematology, hematology, and blood bank. In order to perform in such diversified areas medical technologists are required to have a broad education in the basic sciences and rigorous training in clinical laboratory science. Medical technologists must know both the principles of test procedures and equipment, as well as the significance of the results of these tests in a diagnosis and treatment of disease. Medical technologists find employment in hospital clinical laboratories and in private, state, and federal health laboratories.

The program in Medical Technology at Clemson University consists of three years of lectures and laboratories on the Clemson campus and one year of clinical experience at an accredited school of medical technology. The courses required in the first three years of the program must be completed before the student can begin the clinical (fourth) year. The student must be in good standing at the University and have a grade-point ratio of 2.0 or above before entering a school of medical technology. Admission to these schools is by competition. Each school selects the students who will come to their school. This selection is made on the basis of published admission criteria which include grade-point ratio, grades in science courses, letters of reference, and interviews. Clemson University is affiliated with Anderson Memorial Hospital and McLeod Regional Medical Center. Applications to these schools should be made during the first semester of the junior year.

Upon satisfactory completion of the requirements of the curriculum, the student will receive the Bachelor of Science degree in Medical Technology from Clemson University. In addition to the degree, satisfactory performance on a certification exam is required by most employers.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I	5	BIOL 111 Principles of Biology II	5
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MT 101 Intro. to Med. Tech.	1	EXST 301 Introductory Statistics	3
MTHSC 106 Cal. of One Var. I	4	or MTHSC 301 Stat. Theory and Meth. I	3
	17	Elective	3
			18

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	BIOCH 301 General Biochemistry	3
CH 227 Organic Chemistry Lab	1	CH 224 Organic Chemistry	3
HIST 172 or 173 Western Civilization	3	CH 228 Organic Chemistry Lab	1
MICRO 305 General Microbiology	4	PHYS 208 General Physics II	4
PHYS 207 General Physics I	4	Humanities Requirement[2]	3
Literature Requirement[1]	3	Elective	3
	18		17

JUNIOR YEAR

CH 313 Quantitative Analysis	3	GEN 302 Introductory Genetics	4
CH 317 Quan Anal Lab	1	MICRO 411 Pathogenic Bacteriology	4
MICRO 414 Basic Immunology	3	Humanities Requirement[3]	3
English Requirement[2]	3	Option Requirement[4]	3
Elective	4	Social Science Requirement[3]	3
	14		17

SENIOR YEAR

(52 Weeks)

MT 401 Immunology	3
MT 402 Clinical Microbiology	8
MT 403 Hematology and Hemostasis	5
MT 404 Blood Bank	4
MT 407 Urinalysis	2
MT 408 Clinical Chemistry	10
MT 491 Special Topics in Med Tech.	2
	34

135 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Select from advanced writing or public speaking

[3] Select from courses required to complete an alternate degree in Microbiology should the student not be accepted to a hospital school after completion of the academic requirement for the baccalaureate degree in Medical Technology

[4] The option requirement is to be selected from the following MICRO 400, 401, 412, 413, 415, 416, ZOOL 456, and other courses that will serve as background courses for medical technology

Note: The manner in which each accredited clinical program implements the above curriculum may vary because of institutional differences

MICROBIOLOGY

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae The microbiologist seeks to describe these organisms in terms of their structures, functions and processes of reproduction, growth and death, at both the cellular and molecular levels. He is also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Furthermore, the student receives instruction in mathematics, physics, chemistry, and biochemistry, all of which are essential to the training of a modern-day microbiologist. Through a wide choice of electives, the program allows a student to prepare for a variety of careers. The Microbiology curriculum with Molecular Biology option is recommended for students planning postgraduate programs. The microbiology graduate may enter graduate school in the fields of microbiology, biochemistry, bioengineering or related disciplines; he may enter a medical or dental school; or pursue a career in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisers immediately upon entering the Microbiology program.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Principles of Biology I	5	BIOL 111 Principles of Biology II	5
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
MTHSC 106 Cal. of One Var. I	4	MICRO 100 Microbes and Human Affairs	1
	16	Math. Sci. Requirement[2]	3-4
			16-17

SOPHOMORE YEAR

CH 223 Organic Chemistry	3	BIOCH 301 General Biochemistry	3
CH 227 Organic Chemistry Lab	1	CH 224 Organic Chemistry	3
MICRO 305 General Microbiology	4	CH 228 Organic Chemistry Lab	1
Literature Requirement[1]	3	Literature Requirement[1]	3
Math. Sci. or Sci. Elective[3]	3-4	Math. Sci. or Sci. Elective[3]	4-3
Social Science Elective	3	Microbiology Elective[4]	3
	17-18		17-16

JUNIOR YEAR

ENGL 301 Public Speaking	3	GEN 302 Introductory Genetics	4
MICRO 401 Adv. Bacteriology	4	MICRO 412 Bacterial Physiology	4
Physics Elective[5]	4-3	Physics Elective[5]	4
Elective	6-7	Social Science Elective	3
	17	Elective	3
			18

SENIOR YEAR

Social Science Elective	3	MICRO 411 Path. Bacteriology	4
Elective[4]	14-13	Elective[4]	12
	17-16		16

134 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2] MTHSC 108 is required for the Microbiology-Molecular Biology option. Microbiology majors may select MTHSC 108 or 301.

[3] Select from CPSC 110, EXST 301, GEOL 101, MTHSC 108, or any course at the sophomore level or above offered by the College of Sciences, excluding microbiology.

[4] A minimum of 15 credits must be selected from the following courses: BOT 411, 413, MICRO 405, 407, 409, 410, 413, 414, 415, 416, 417, 491, PLPA 416, PS 458, ZOOL 403, 416.

[5] To be selected from the following course sequences: either PHYS 207, 208, or 122, 221, 222.

This curriculum provides a minimum of 22 hours approved electives. Military science or aerospace studies may be elected if desired.

MICROBIOLOGY—MOLECULAR BIOLOGY OPTION

See Microbiology curriculum for Freshman year

SOPHOMORE YEAR

First Semester		Second Semester	
CH 223 Organic Chemistry	3	BIOCH 301 General Biochemistry	3
CH 227 Organic Chemistry Lab	1	CH 224 Organic Chemistry	3
MICRO 305 General Microbiology	4	CH 228 Organic Chemistry Lab	1
Literature Requirement[1]	3	Literature Requirement[1]	3
Math. Sci. Requirement[3]	3	Microbiology Elective[2]	3
Social Science Elective	3	Social Science Elective	3
	17		16

JUNIOR YEAR

ENGL 301 Public Speaking	3	CH 313 Quantitative Analysis or PHYS 417 Intro. to Biophysics I	3
MICRO 401 Adv. Bacteriology	4	GEN 302 Introductory Genetics	4
MICRO 414 Basic Immunology	3	MICRO 412 Bacterial Physiology	4
Physics Elective[4]	4-3	Physics Elective[4]	4
Elective[5]	3-4	Elective[5]	3
	17		18

SENIOR YEAR

BIOCH 423 Prin. of Biochemistry	3	BIOCH 424 Prin. of Biochemistry	3
MICRO 415 Microbial Genetics	4	MICRO 411 Path. Bacteriology	4
MICRO 416 Introductory Virology	3	MICRO 491 Special Problems	2
Social Science Elective	3	Elective[5]	8
Elective[5]	3		17
	16		

134 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[2] Select from BOT 411, 413, MICRO 400, 403, 407, 410, 413, 417, PLPA 456, PS 458, ZOOL 403, 456.

[3] Select from CPSC 110, EXST 301, MTHSC 301.

[4] Select from the following course sequences: Either PHYS 207, 208 or 122, 221, 223.

[5] Should include one of the following courses: CH 313, 317, CPSC 110, EXST 301.

Note: Recommended electives in addition to those listed above are BIOCH 425, 426, BIOE 401, MTHSC 206, PHYS 473, ZOOL 459.

This option provides 17 semester hours of open approved electives. Military science or aerospace studies may be elected if desired.

PHYSICS

Physics is the most fundamental of the natural sciences, and it forms the basis upon which the study of other branches of science is founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles and the properties of liquids, crystalline solids, and other materials. It also includes the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula are designed to provide students with a strong background in the classical areas of physics as well as a basic introduction into the more important aspects of modern physics. The BS in Physics curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas of engineering and applied science. Experimental modern physics is strongly emphasized.

FRESHMAN YEAR

First Semester		Second Semester	
CH 101 General Chemistry	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
HIST 172 or 173 West. Civilization	3	MTHSC 108 Cal. of One Var. II	4
MTHSC 106 Cal. of One Var. I	4	PHYS 122 Phys. with Cal. I	3
PHYS 101 Current Topics in Modern Physics	1	PHYS 124 Physics Lab. I	1
	15		15

SOPHOMORE YEAR

FR 101 Elementary French[1]	4	FR 102 Elementary French[1]	4
or GER 101 Elem. German[1]	4	or GER 102 Elem. German[1]	4
MTHSC 206 Calculus of Sev. Var.	4	MTHSC 208 Intro. to Ord. Diff. Equa.	4
PHYS 221 Phys. with Cal. II	3	PHYS 222 Phys. with Cal. III	3
PHYS 223 Physics Lab. II	1	PHYS 224 Physics Lab. III	1
Literature Requirement[2]	3	Computer Science (as approved)	3
	15	Literature Requirement[2]	3
			18

JUNIOR YEAR

E&CE (PHYS) 340 Electromagnetics I	2	E&CE (PHYS) 341 Electromagnetics II	2
ENGL 301 Public Speaking	3	PHYS 322 Mechanics II	3
or ENGL 314 Technical Writing	3	PHYS 326 Exper. Physics II	3
MTHSC 425 Orthogonal Functions		Option	3
and Boundary Value Problems	3	Elective	6
PHYS 321 Mechanics I	3		17
PHYS 325 Exper. Physics I	3		
Option	3		
	17		

SENIOR YEAR

PHYS 401 Senior Thesis I	3	Physics (as approved)	3
or PHYS 427 Instr. in Exp. Phys.	3	Option	3
PHYS 442 Electromagnetic Theory	3	Social Science Requirement	3
PHYS 455 Quantum Physics I	3	Approved Elective	4
PHYS 465 Therm. and Stat. Mech.	3	Elective	4
Option	3		17
	15		

129 Total Semester Hours

OPTIONS

Electronics[3]		**Geophysics**	
E&CE 202 Electric Circuits I	3	GEOL 101 Physical Geology	4
E&CE 301 Electric Circuits II	3	GEOL 406 Mineralogy	3
E&CE 320 Electronics I	3	Any two:	
E&CE 330 Elec. Sys. Analysis	3	GEOL 402 Struc. Geology	3
	12	GEOL 409 Petrology	3
		PHYS 446 Solid State Physics	3
			13

Chemical Physics		**Computer Science**	
CH 331 Physical Chemistry	3	CPSC 110 Elem. Comp. Prog.	3
CH 332 Physical Chemistry	3	CPSC 230 Assem. Lang. Prog.	3
CH 402 Inorganic Chemistry	3	Computer Science (as approved)	3
or PHYS 456 Quantum Physics II	3	or PHYS 446 Solid State Phys.	3
CH 435 Spec. and Molec. Struc.	3	MTHSC 460 Intro. to Num. Analysis I	3
	12		12

Astrophysics		**Physics**	
ASTR 301 General Astronomy	3	PHYS 446 Solid State Physics	3
ASTR 302 Astrophysics	3	PHYS 456 Quantum Physics II	3
Astronomy (two 400-level courses)	6	Math. Sci. (as approved)	6
	12		12

Mathematical Physics	
MTHSC 434 Adv. Engr. Math.	3
MTHSC 435 Complex Variables	3
PHYS 456 Quantum Physics II	3
Math. Sci. (as approved)	3
	12

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[1] RUSS 101, 102 may be substituted.
[2] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.
[3] Students in the Electronics Option must take E&CE 201 and 301 in lieu of 2 credits of approved electives.

PHYSICS—BIOPHYSICS OPTION

The Biophysics option offers an excellent preparation for medical school or graduate work in biological science. It requires a total of 25 credits of approved electives in chemistry, biological science, physics, or mathematics.

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 110 Prinicples of Biology I	5	CH 102 General Chemistry	4
CH 101 General Chemistry	4	ENGL 102 Composition II	3
ENGL 101 Composition I	3	MTHSC 108 Cal. of One Var. II	4
MTHSC 106 Cal. of One Var. I	4	PHYS 122 Phys. with Cal. I	3
PHYS 101 Current Topics in Modern Physics	1	PHYS 124 Physics Lab. I	1
		Elective	3
	17		18

SOPHOMORE YEAR

MTHSC 206 Calculus of Sev. Var.	4	MTHSC 208 Intro. to Ord. Diff. Equa.	4
PHYS 221 Phys with Cal. II	3	PHYS 222 Phys. with Cal. III	3
PHYS 223 Physics Lab. II	1	PHYS 224 Physics Lab. III	1
Biophysics Requirement[1]	4	Biophysics Requirement[1]	4
Literature Requirement[3]	3	Literature Requirement[3]	3
	15		15

JUNIOR YEAR

E&CE (PHYS) 340 Electromagnetics I	2	E&CE (PHYS) 341 Electromagnetics II	2
FR 101 Elementary French[2]	4	FR 102 Elementary French[2]	4
or GER 101 Elementary German[2]	4	or GER 102 Elementary German[2]	4
PHYS 321 Mechanics I	3	HIST 172 or 173 Western Civilization	3
PHYS 325 Experimental Physics I	3	PHYS 322 Mechanics II	3
Biophysics Requirement[1]	3	Biophysics Requirement[1]	3
Soc. Sci. Requirement	3		15
	18		

SENIOR YEAR

PHYS 455 Quantum Physics I	3	ENGL 301 Public Speaking	3
PHYS 465 Thermodynamics and Statistical Mechanics[4]	3	or ENGL 314 Technical Writing	3
Biophysics Requirement[1]	3	Biophysics Requirement[1]	6
Computer Science (as approved)	3	Physics (as approved)	3
Elective	3	Elective	4
	15		16

129 Total Semester Hours

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[1] Select from an approved courselist from offerings in physics, chemistry, mathematics, and the biological sciences. At least six hours must be in the biological sciences.

[2] RUSS 101, 102 may be substituted.

[3] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209.

[4] An approved physics course may be substituted for PHYS 465 if the student satisfactorily completes CH 331, 332.

PREPROFESSIONAL HEALTH STUDIES

The health professions, such as medicine and dentistry, need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools, but all recognize the desirability of a broad education—a good foundation in the natural sciences (biology, chemistry, mathematics, and physics), highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are purposely limited to allow latitude for developing individualized undergraduate programs of study; however, all schools of medicine and dentistry require sixteen semester hours of chemistry, including organic chemistry, eight semester hours of biological sciences, eight semester hours of physics, and at least one course in calculus. These requirements in the natural sciences should be balanced with courses in vocabulary building, the humanities (literature, music, art, history, philosophy), and social sciences (economics, political science, psychology, sociology). The basic requirements in the natural sciences and as many as possible of the courses in the humanities and the social sciences should be completed by the third year of study so that the student will be prepared to take the Dental Admission Test or the Medical College Admission Test prior to making application to a professional school

Undergraduates may prepare also to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, the interested student is advised to consult with the Coordinator for Professional Health Studies.

At Clemson, rather than having a separate, organized preprofessional health study program, it is felt that an undergraduate student should be allowed to major in any curriculum, so long as the basic entrance requirements of the chosen professional health school are fulfilled. These schools are not so much concerned about a student's major as they are concerned that the student does well in whichever curriculum he chooses.

Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.

PREPHYSICAL THERAPY

Physical Therapy is a transfer, baccalaureate degree program at the Medical University of South Carolina. Students may acquire the prerequisites for the two-year professional training by following the suggested curriculum offered by Clemson University.

FIRST YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biol Lab I	1	BIOL 106 General Biol Lab II	1
CH 101 General Chemistry[1]	4	CH 102 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
PSYCH 201 Intro to Psychology	3	Psychology Elective	3
Mathematical Sciences Elective[2]	3-5	Elective	3
	17-19		17

SECOND YEAR

PHYS 207 General Physics I[1]	4	PHYS 208 General Physics II	4
ZOOL 222 Human Anatomy	4	ZOOL 223 Human Physiology	4
Humanities Elective	3	Humanities Elective	6
Social Science Elective	3	Elective	3
Elective	3		
	17		17

68-70 Total Semester Hours

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[1] Chemistry requires proficiency in algebra, and physics requires proficiency in trigonometry, therefore, entering freshmen must present a score of 550 or above on Level II of the Mathematics Achievement Test or register in the first semester for MTHSC 105

[2] May be replaced by MTHSC 105 if necessary to satisfy the footnote above

PREPHARMACY

Prepharmacy is a five-year program, the first two years of which can be taken at Clemson. The student who follows the Prepharmacy curriculum will transfer, as a rule, to the College of Pharmacy at the Medical University of South Carolina or the College of Pharmacy at the University of South Carolina where the final three years will be completed. The degree in Pharmacy will be awarded by the institution attended. The following courses, including footnotes, satisfy entrance requirements for the Medical University of South Carolina or the University of South Carolina.

FIRST YEAR

First Semester		Second Semester	
BIOL 103 General Biology I	3	BIOL 104 General Biology II	3
BIOL 105 General Biology Lab I	1	BIOL 106 General Biology Lab II	1
CH 101 General Chemistry[2]	4	CH 112 General Chemistry	4
ENGL 101 Composition I	3	ENGL 102 Composition II	3
Required Elective[3]	3	MTHSC 106 Cal. of One Var. I	4
Elective	3	Required Elective[3]	0-3
	17		15-18

SECOND YEAR

CH 223 Organic Chemistry	3	CH 224 Organic Chemistry	3
CH 227 Organic Chemistry Lab	1	CH 228 Organic Chemistry Lab	1
PHYS 207 General Physics I[2]	4	PHYS 208 General Physics II	4
Literature Requirement[1]	3	Literature Requirement[1]	3
Required Elective[4]	4-6	Required Elective[4]	4-6
	15-17		15-17

62-69 Total Semester Hours

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[1] Select from ENGL 202, 203, 204, 205, 206, 207, 208, 209

[2] Chemistry requires proficiency in algebra, and physics requires proficiency in trigonometry, therefore, entering freshmen must present a score of 550 or more on Level II of the Mathematics Achievement Test or register in the first semester for MTHSC 105.

[3] Six hours of history are required by the Medical University of South Carolina, ECON 200 or 211 is required by the University of South Carolina.

[4] Six hours of liberal arts or humanities credits are required each semester by the Medical University of South Carolina, ZOOL 222 and 223 are required by the University of South Carolina

Description of Courses

This list of courses includes for each course the catalog number, title of course, credit in semester hours, class laboratory hours per week, and the description of the course. In general, courses numbered 600 and above are graduate courses and are open only to students admitted to the graduate school, except that seniors with exceptional records may be enrolled with special permission. Where courses are offered on a schedule, there is a designation F, S or SS following the title of each course, indicating whether it is customarily offered in the fall, spring, or summer school.

ACCOUNTING (ACCT)

Professors: J. R. Davis, G. T. Friedlob, J. G. Louderback, R. W. Rouse, J. D. Sheriff, J. E. Trapnell, *Director,* J. A. Turner, Jr., J. M. Wannamaker, *Associate Professors:* E. L. Bryan, L. S. Cash, L. S. Clark, T. L. Dickens, A. C. Drews, F. R. Gray, L. R. Ramsay, *Assistant Professors:* R. K. Doost, L. S. Schleifer, R. E. Welton, Jr., *Lecturers:* N. E. Byerley, V. D. Guide, R. L. Hickman, P. L. James, F. K. Nabangi, W. R. Owens, Jr., M. A. Prater, C. J. Ringeisen

101 (FIN) Accounting and Finance Orientation 1(1,0) A broad overview of the nature of accounting and finance and their role in the industrial, financial, and governmental environments. If taken for credit, this course must be completed before or concurrently with ACCT 200 or 201. Offered only on Pass/Fail basis.

200 Basic Accounting 3(3,0) This course is designed as a general survey of accounting for the student requiring only a basic knowledge of principles and concepts. May not be taken by students in curricula requiring ACCT 201 or 203.

201, H201 Principles of Accounting 3(3,0) Introduction to the role of accounting, basic concepts and methodology, processing of business transactions, valuation and income determination principles, and financial statement preparation.

202, H202 Principles of Accounting 3(3,0) Continuation of ACCT 201, covering accounting for the corporate form of the business entity and elements of accounting for management planning, budgeting, and control. Emphasis is on management uses of accounting information. *Preq:* ACCT 201.

203 Financial Accounting 3(3,0) Emphasizes the principles and methods which influence the financial statements provided to external users. May not be taken by students in curricula requiring ACCT 200 or 201.

210 Federal Taxation for Non-Accountants 3(3,0) Survey of the taxation of individuals, corporations, partnerships, estates, gifts, and trusts for the general business and nonbusiness student. Open to all majors but may not be taken for credit by Accounting or Financial Management majors.

301 Intermediate Accounting 3(3,0) Indepth treatment of the traditional financial accounting topics of current assets, noncurrent assets, and present values as well as recent developments in accounting valuation, reporting practices, environment of accounting, and basic theory underlying financial accounting. *Preq:* ACCT 202.

302 Intermediate Accounting 3(3,0) Indepth treatment of the traditional financial accounting topics of current liabilities, long-term liabilities, stockholders' equity, earnings per share, investments, revenue recognition, leases, and statement of changes in financial position. *Preq:* ACCT 301.

303 Cost Accounting 3(3,0) The application of cost analysis to manufacturing and distributing problems. Analysis of behavior characteristics of business costs and a study of principles involved in standard cost systems. Lectures and problems. *Preq:* ACCT 202.

307 Managerial Accounting 3(3,0) Emphasizes internal use of accounting data by the manager in establishing plans and objectives, controlling operations, and making decisions involved with management of an enterprise. Cannot be taken for credit by Accounting majors. *Preq:* ACCT 202 or 203.

401 Financial Accounting Problems 3(3,0) Indepth treatment of the traditional financial accounting topics of deferred income taxes, pension costs, accounting changes and error analysis, disclosure, accounting for partnerships, as well as introduction to fund accounting concepts. *Preq:* ACCT 302

403 Selected Topics in Accounting 3(3,0) Course provides for indepth study and research into one or a few accounting topics chosen by the instructor *Preq:* Consent of instructor.

404, 604 Individual Taxation 3(3,0) Interpretation of Federal income tax laws, regulations, and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. *Preq:* Junior standing

405 Corporate Taxation 3(3,0) Tax planning and research, income taxation with emphasis on special problems applicable to corporations, partnerships, estates and trusts. *Preq:* Junior standing.

407 Accounting Research 1(1,0) Directed research course for those students interested in a career in accounting. *Preq:* ACCT 302 and ENGL 304

410, 610 Budgeting and Executive Control 3(3,0) Study and application of selected techniques used in the planning and control functions of business organizations. *Preq:* ACCT 303 or 307.

411 Financial Accounting Problems 3(3,0) Study of accounting principles and practices relating to business combinations, foreign operations, partnerships, and governmental accounting. *Preq:* ACCT 401 or consent of instructor

415 Auditing 3(3,0) Professional and practical auditing theory. Review of internal controls, audit procedures, and development of audit programs for various types of businesses; consideration of auditor's professional and ethical standards. *Preq:* ACCT 302

416 Auditing in an Electronic Data Processing Environment 3(3,0) Application of electronic data processing controls as they relate to the auditing function. The course focuses on the evaluation of controls and data in an automatic environment. *Preq:* ACCT 415 and 422, or consent of instructor.

420 Certified Public Accountant Problems 3(3,0) Intensive practice in analyzing and solving certified public accountant-level accounting problems. Offered only on pass/fail basis for free elective credit. *Preq:* ACCT 411 or consent of instructor.

422 Accounting Information Systems 3(3,0) Study of computer-based accounting systems with attention to systems design, application, internal control, auditing the system, and system security. *Preq:* ACCT 301 and CPSC 130.

425 Contemporary Accounting Theory 3(3,0) Contemporary accounting theory emphasizes the major challenges and controversies within the field of accounting today. Attention is given to theoretical and conceptual issues underlying current financial reporting as well as pragmatic conventions. The evolution of accounting objectives and standards, as evidenced by the pronouncements of professional organizations, will receive special emphasis. *Preq.* ACCT 302.

430, 630 Governmental and Institutional Accounting 3(3,0) Accounting and reporting principles, standards, and procedures used by the Federal government, state and local governments, and other not-for-profit institutions are examined and discussed. Hospital and university accounting are reviewed. Unique aspects of the governmental auditing environment are analyzed. *Preq:* ACCT 302 or consent of instructor.

801 Contemporary Financial Accounting Theory 3(3,0)

802 Advanced Auditing I 3(3,0)

803 Accounting Information Systems 3(3,0)

804 The Environment of Accounting 3(3,0)

805 Research Seminar in Accounting 1(1,0)

806 Seminar in Current Accounting Problems 3(3,0)

807 Advanced Auditing II 3(3,0)

815 Federal and State Income Taxation of Corporations 3(3,0)

816 Taxation of Estates, Gifts and Fiduciaries 3(3,0)

817 Tax Planning and Research 3(3,0)

818 Taxation of Partnerships 3(3,0)

819 Special Topics in Taxation 3(3,0)

821 Controllership 3(3,0)

822 Management Accounting in Textiles and Manufacturing 3(3,0)

823 Management Accounting in Financial Institutions 3(3,0)

AEROSPACE STUDIES (AS)

Professor W. R. Austin II, *Head; Assistant Professors* F. M. Conner, Jr., D. D. Nave, D. E. Schaupp, W. K. Younginer

109 Air Force Today I 1(1,1) This course deals with the Air Force in the contemporary world through a study of the total force structure: strategic offensive and defensive, general purpose, and aerospace support. Leadership laboratory activities include drill fundamentals, customs, and courtesies of the service.

110 Air Force Today II 1(1,1) Continuation of AS 109. Leadership laboratory includes drill, ceremonies, and an introduction of Air Force career opportunities.

209 Development of Air Power I 1(1,1) The course includes the study of the development of air power from balloons and dirigibles through the peaceful employment of U.S. air power in relief missions and civic action programs in the late 1970s and also the air war in Southeast Asia. Leadership laboratory provides experience in guiding, directing, and controlling an Air Force unit.

210 Development of Air Power II 1(1,1) Continuation of AS 209.

309 Air Force Leadership and Management I 3(3,1) Course emphasizing the indivdual as a manager. Individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the Air Force officer's professional skills. Students will prepare individual and group presentations, write reports, participate in group discussions, seminars, and conferences.

310 Air Force Leadership and Management II 3(3,1) Continuation of AS 309, using the basic managerial processes involving decision-making, utilization of analytical aids in planning, organizing, and controlling environment. Actual case studies are used to enhance learning and communication processes.

409 National Security Policy I 3(3,1) Analysis of the role and function of the military officer in a democratic society and the relationships involved in civil-military interactions. Flight instruction and ground school for pilot candidates. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions.

410 National Security Policy II 3(3,1) Continuation of AS 409, examining the environmental context in which U.S. defense policy is formulated and implemented. Emphasis placed on initial commissioned service and military justice. Students will be expected to prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences.

AGRICULTURAL ECONOMICS (AGEC)

Professors: L. L. Bauer, B. L. Dillman, J. E. Faris, M. S. Henry, J. C. Hite, J. W. Hubbard, J. S. Lytle, E. L. McLean, S. E. Miller, B. H. Robinson, *Head;* C. S. Thompson, G. J. Wells; *Associate Professors:* M. D. Hammig, K. H. Kahl, E. H. Kaiser, J. C. Nyankori; *Assistant Professors:* G. M. Clary, R. S. Pomeroy

202 Agricultural Economics 3(3,0)F, S Analytical survey of the various subdivisions of agricultural economics, to include farm organization, enterprise, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy.

302 Economics of Farm Management 3(2,3)F Economic principles underlying the organization and operation of agricultural firms and related business enterprises. Particular emphasis is directed to management aspects of the farm as a production unit. *Preq:* AGEC 202 or ECON 211.

308 Quantitative Agricultural Economics 3(3,0)S Basic quantitative relationships in agricultural economics are examined and interpreted using mathematics. Emphasis is placed on the use of deterministic models in agricultural production and marketing and in the examination of the interrelationships between the performance of the U.S. economy and the agricultural sector. *Preq:* AGEC 202 or ECON 211; EXST 301 or MTHSC 203; MTHSC 102 or 106.

309, H309 Economics of Agricultural Marketing 3(3,0)F General course in marketing agricultural commodities with particular emphasis upon food products. Efficiency criteria, consumer behavior, market organizations and institutions, and marketing functions are analyzed. *Preq:* AGEC 202.

319 Agribusiness Management 3(3,0)F Study of the principles used in making management decisions and the application of these principles in agribusiness. Emphasis is given to the application of economics to the solution of problems facing managers of agricultural supply and marketing firms. *Preq:* AGEC 302 or 309.

351 Agricultural Sales, Merchandising, and Advertising 3(3,0)F Examination of professional selling and the role and mechanisms of sales promotion and advertising in an agricultural environment. Topics include the sales process, promotion, and merchandising devices, media advertising, and display. *Preq:* Junior standing.

352 Public Finance 3(3,0)S Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy. *Preq:* Junior standing.

402, 602 Production Economics 3(3,0)F Economic analysis of agricultural production involving (a) the concept of the farm as a firm, (b) principles for decision making, (c) the quantitative nature and use of production and cost functions and their interrelations and application of these principles to resource allocation in farms and among areas. *Preq:* AGEC 308 and ECON 314.

403, 603 Land Economics 3(3,0)S Study of the characteristics of land and of the physical, legal, social and economic principles and problems relating to the control and use of land resources. Preq: AGEC 202 or ECON 200.

406 Seminar 1(1,0)S Examination of the relation of economics and sociology to specific problems. *Preq:* Senior standing.

409, 609 Commodity Futures Markets 3(3,0)F Introduction to the economic theory, organization, and operating principles of agricultural commodity futures markets in the U.S. Emphasis is placed on speculating, hedging, and investing in agricultural commodity futures contracts from the standpoint of the agribusiness entrepreneur. *Preq:* AGEC 202 or ECON 211.

411, 611 (CRD) Regional Impact Analysis 2(2,0) See CRD 411.

412, 612 (CRD) Spatial Competition and Rural Development 2(2,0) See CRD 412.

413, 613 Rural Property Appraisal 3(3,0)S Study of the principles and procedures of appraising rural properties. Attention will be focused on types of appraisal approaches and economic factors considered in appraising rural properties. *Preq:* ACCT 200 or 201, AGEC 202 or ECON 211.

420, 620 World Agricultural Trade 3(3,0)S Practical considerations of agricultural trade and trade policy analysis are reviewed. The role of international institutions is considered. Special emphasis is placed on concepts of agricultural trade, analysis of trade policies of major trading partners/competitors, and export/import marketing of agricultural products. *Preq:* AGEC 309, ECON 412, or approval of instructor.

425, 625 Aquaculture Economics 3(3,0)F Offered alternate years. Application of economics and business principles by firms engaged in fish farming. Basic microeconomic theory is reviewed and applied to aquacultural enterprises. Stress is given to financial management, investment analysis, and marketing management. Public policy affecting aquaculture is also discussed and international aquaculture development reviewed. *Preq:* AGEC 202 and 309 and WFB 350 or consent of instructor.

452, H452, 652 Agricultural Policy 3(3,0)F Review of public agricultural policy programs in the United States and a critical examination of current and proposed government policies and programs affecting the agricultural sector of the economy. Included are economic considerations as related to past and current farm price and income problems. *Preq:* AGEC 302 and 309.

456, H456, 656 Prices 3(3,0)S Review of the basic theory of price under competitive conditions and various modifications; nature, measurement and causes of daily, seasonal and cyclical price fluctuations; geographical price relationships; nature, function and behavior of futures markets; government price programs. *Preq:* AGEC 308, ECON 314, EXST 462.

460, 660 Agricultural Finance 3(3,0)F The study of the principles and techniques of financing in the agricultural sector. Topics include the capital situation in agriculture, concepts of farm financial management, use of credit, capital markets, lending agencies, and estate planning. *Preq:* ACCT 200 or 201, AGEC 202.

491 (CRD) Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) See CRD 491

719 Professional Problems in Agribusiness Management 3(3,0)

791 Selected Topics in Agricultural Economics 1-3(1-3,0)

802 Advanced Production Economics 3(3,0)

806 Input-Output Analysis and Regional Structure 2(2,0)

807 Market Structure in Agricultural Industries 3(3,0)

808 Applied Quantifications in Agricultural Economics 3(3,0)

809 Advanced Natural Resource Economics 3(3,0)

810 Water and Marine Resources Management and Policy 3(3,0)

812 Interregional Competition Analysis 2(2,0)

814 Contemporary Public Policy 3(3,0)

827 Advanced Agricultural Consumption and Demand 3(3,0)

851 Seminar in Research Methodology 1(1,0)

852 Research Methods for Agricultural Economists I 2(2,0)

853 Research Methods for Agricultural Economists II 2(2,0)

871 Workshop in Quantitative Methods in Agricultural Economics 1(1,0)

872 Techniques of Survey Analysis in Social Sciences 1(1,0)

881 Internship in Community and Resource Development 1-6

891 Master's Research. Credit to be arranged.

901 (ECON) Price Theory 3(3,0)

902 (ECON) Production Economic Problems 2(2,0)

903 (ECON) General Equilibrium and Welfare Theory 3(3,0)

904 (ECON) Seminar in Resource Economics 3(3,0)

905 (ECON) Advanced Macro Issues 3(3,0)

906 (ECON) Seminar in Area Economic Development 3(3,0)

907 (ECON) Agricultural Marketing Problems 2(2,0)

917 (ECON) Advanced Seminar in Labor Economics 3(3,0)

991 (ECON) Doctoral Research. Credit to be arranged.

AGRICULTURAL EDUCATION (AGED)

Professors: L. H. Blanton, J. A. Hash, R. J. Mercer, J. H. Rodgers, *Head; Associate Professor:* J. H. Daniels

100 Orientation and Field Experience 1(0,2) Supervised observations and explanations of vocational agriculture teaching while serving as teacher aides. One full week of field experience in representative high schools is required.

201 Introduction to Agricultural Education 3(2,3)F Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of agricultural courses.

300 Supervised Field Experience I 1(0,3) Actual participation in vocational agriculture teaching activities plus conferences with local supervising teachers and college supervisors. One full week of field experiences in specialized high school programs or area vocational centers is required.

400 Supervised Field Experience II 1(0,3) Special emphasis is placed on filling gaps in existing knowledge and experiences of the students. The primary focus will be on becoming acquainted with the student teaching center well in advance of the customary twelve-week directed teaching experience.

401, 601 Methods in Agricultural Education 3(2,3)S Appropriate methods of teaching vocational agriculture in high schools. The course includes procedures for organizing teaching programs, teaching high school students, and directing F.F.A. activities.

406 Directed Teaching 12(0,36) Guided participation in the professional responsibilities of a teacher of vocational agriculture including an intensive study of the problems encountered and the competencies developed. Twelve weeks of directed teaching in selected schools is required. *Preq:* AGED 400, 401

423, 623 Curriculum 2(2,0)F Curriculum goals and related planning for career and continuing education programs.

425, 625 Teaching Agricultural Mechanics 2(1,3)S Organizing course content, conducting and managing an agricultural mechanics laboratory, shop safety, microteaching demonstrations of psychomotor skills, and methods of teaching manipulative abilities.

428, 628 Special Studies in Agricultural Education 1-3(1-3,0) Students are provided with an opportunity to study individually or collectively selected topics and/or problems in agricultural education to meet the particular needs of the clientele enrolled. May be taken twice or for a maximum of six semester hours credit.

430, 630 Fundamentals of Extension Education 2(2,0) Course is designed to introduce students to fundamental philosophy, activities, and methods undergirding the Cooperative Extension Service. *Preq:* Consent of instructor.

431, 631 Methods in Environmental Education 3(3,0)SS Study of various techniques appropriate for teaching environmental education. Instruction is applicable to elementary, high school, and adult-level teachers. Offered in Summer School only.

432, 632 Visual Media for Agribusiness 3(2,3) Theoretical and practical course for professionals in agriculture with major emphasis on visual communications.

450, 650 Modern Topics and Issues 3(3,0) A major area of concern to teachers of agriculture and county agents will be selected for intensive study at least one semester prior to offering the course. Team teaching with faculty from other departments in the College of Agricultural Sciences will be utilized when feasible. *Preq:* Senior standing or relevant experience.

465, 665 Program and Curriculum Development 3(3,0)F. Even-numbered years. Each student will determine needs and resources in a specific community and plan a program and curriculum to meet these needs. Instruction is appropriate for agricultural, extension, and vocational personnel.

467, 667 Adult Education in Agriculture 3(2,3)S. Odd-numbered years. Principles and practices appropriate to the solution of problems encountered in instructional programs for adult farmers.

480, 680 (COLED, ED, INED) Educational Applications of Microcomputers 3(3,0) See COLED 480

482, 682 (COLED, ED, INED) Advanced Educational Applications of Microcomputers 3(2,2) See COLED 482

726 Agricultural Mechanization for Inservice Teachers 3(3,0)

727 Agricultural Education Shop Management 3(1,6)

736 Internship: Teaching 3(1,6)

737 Internship in Agribusiness Firms 3(1,6)

750 Special Institute Course: Selected Topics in Agricultural Education 1-3(1-3,0)

803 Evaluation of Instructional Programs 3(2,3)

804 Special Problems 3(2,3)

805 Administration and Supervision in Agricultural Education 3(3,0)

815 Teaching Agricultural and Power Mechanics 3(2,3)

821 Theories and Practices of Adult Education 3(3,0)

825 Supervision of Student Teaching 3(3,0)

869 Seminar 1-3(1-3,0)

889 (ED, INED) Research in Education 3(3,0)

AGRICULTURAL ENGINEERING (AGE)

Professors: W. H. Allen, J. M. Bunn, T. H. Garner, R. O. Hegg, *Head,* C. E. Hood, Jr., J. R. Lambert, J. T. Ligon, R. K. White, R. E. Williamson, R. E. Young; *Associate Professors:* J. A. Collier, J. C. Hayes; *Assistant Professors:* R. B. Dodd, Y. J. Han

181 Agricultural Engineering Concepts 1(0,3)S. This course utilizes computers and basic engineering concepts to solve typical agricultural engineering problems. Tours, guest speakers, and films are used to acquaint the student with problems in engineering practice. The topics covered prepare the student to use the computer in subsequent courses. *Preq:* ENGR 180 or consent of instructor.

212 Fundamentals of Mechanization 3(2,3)S. Functional analysis of selected agricultural equipment and the economic performance of machine systems; also, the utility and principles of applied technology and processes essential to providing a background for engineering design, research and development. *Preq:* EG 109.

221 Soil and Water Resources Engineering I 3(2,3)F. Physical relationships of factors governing rainfall disposition are used as bases for defining the hydrology of agricultural watersheds. The surveying necessary for design and application of resource management measures and structures is taught. *Preq:* MTHSC 106.

353 Computational Systems 2(1,3) Digital and analog techniques are used to solve agricultural engineering problems, including simulation of biological systems. Hybrid and advanced digital computational methods are studied. *Preq:* ENGR 180, MTHSC 208.

355 Engineering Analysis and Creativity 2(1,3) The creative and analytical portions of the engineering design process are developed in a problem approach. Application of physical and mathematical principles, analytical and experimental modeling and intelligent assumption making are stressed. Students are also introduced to the techniques of systems analysis. *Preq:* MTHSC 208, PHYS 221.

362 Energy Conversion in Agricultural Systems 3(2,3)F. The energy requirements of agricultural systems with emphasis on energy conversion methods. Characteristics of various sources of energy will be considered including economic aspects. The present energy conversion mechanisms used in agriculture will be studied and their limitations considered. *Preq:* ME 310.

364 Agricultural Waste-Management Systems 2(2,0) The course will include planning and design of waste-management systems which employ physical, biological, and chemical processes for the treatment and utilizations of agricultural wastes. Solid, liquid, and gaseous wastes are considered. Presentations are relevant to current agricultural practices and legal and social restraints.

416, 616 Agricultural Machinery Design 3(2,3)S Engineering analysis of machines and basic agricultural operations and systems requiring machine functions. Fundamentals of machine design with applications to agricultural machinery. A design project is executed. *Preq:* EM 304.

422, 622 Soil and Water Resources Engineering II 3(2,3)S Basic soil-water-plant relationships are used to establish criteria for the analysis and design of facilities and structures for conservation, water control, drainage and irrigation. Engineering relationships involved in the design of such facilities are emphasized. *Preq:* AGE 221, AGRON 202, EM 320, or consent of instructor.

431, 631 Agricultural Structures and Environmental Design 4(3,3) Analytic design of statically determinant building components with emphasis on wood, steel, and concrete. Environmental requirements for agricultural production systems are determined and utilized for designing heating, cooling, and ventilation systems. *Preq:* EM 304.

442, 642 Agricultural Process Engineering 3(2,3)S Design of unit operations components used in agricultural processing. Engineering principles and instrumentation as applied to control systems, heat transfer, materials handling, storage, and related subjects are emphasized. *Preq:* E&CE 307, EM 320, ME 310.

450, 650 Agricultural Engineering Instrumentation 3(2,3) Overview of modern instrumentation techniques in agricultural engineering systems. Emphasis is on laboratory use of equipment. Topics include performance characteristics of instruments, analog signal conditioning, transducer theory and applications, and digital systems for data acquisition and control. *Preq:* E&CE 307, MTHSC 208, familiarity with computer programming, or consent of instructor.

451, H451, 651 (ESE, FOR) Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) Topics dealing with the development and protection of land, air, water, and related resources will be covered by seminar with instructor and by invited lecturers. Current environmental and/or resource conservation issues will be addressed. *Preq:* Senior or graduate standing, consent of instructor.

465, 665 Engineering Properties of Biological Materials 2(1,3)S The thermal, electrical, mechanical, and chemical characteristics of biological materials, organisms, and metabolic processes are studied in relationship to engineering analysis and synthesis. The effects of environmental factors imposed by engineering processes are evaluated. *Preq:* AGE 353.

471 Research I 1(0,3) This course is designed to acquaint senior students in Agricultural Engineering with the scientific method through execution of an independent research project. Selection of a research topic, a thorough literature review, and detailed and analytical investigation will be required. *Preq:* Senior standing in Agricultural Engineering or other engineering curricula.

472 Research II 1(0,3) Continuation of AGE 471. Students will complete their research projects with experimental verification of the analytical model developed in previous course. A formal report and an oral presentation of results are required. An introduction to real-world engineering problems will be accomplished through guest lecturers. *Preq:* AGE 471.

473, H473 Special Topics in Agricultural Engineering 3(3,0) Comprehensive study of special topics in the field of agricultural engineering not covered in other courses. Special emphasis will be placed on independent pursuit of detailed investigations.

781 Special Problems 1-3

811 Tillage and Soil Dynamics 3(3,0)

822 Water Movement in Soils 3(3,0)

865 Heat and Moisture Transfer in Biological Materials 3(3,0)

871 Selected Topics in Agricultural Engineering 1-3

882 Systems Engineering 3(3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

AGRICULTURAL MECHANIZATION (AGM)

Professors: W. H. Allen, J. M. Bunn, T. H. Garner, R. O. Hegg, C. E. Hood, Jr., J. R. Lambert, J. T. Ligon, R. K. White, R. E. Williamson, R. E. Young; *Associate Professors:* J. A. Collier, J. C. Hayes; *Assistant Professors:* R. B. Dodd, Y. J. Han

205 Principles of Farm Shop 3(2,3) Principles, techniques, and methods in the selection, proper use and maintenance of hand and power tools. Principal topics include welding, tool fitting, metalwork, woodworking, finishing and preserving, pipe fitting, and farm masonry.

206 Agricultural Mechanization 3(2,3) The agricultural student is taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability are stressed. *Preq:* MTHSC 105, PHYS 207 or consent of instructor.

301 Soil and Water Conservation 3(2,3) Water management in agriculture is studied by applying principles of elementary surveying, mathematics and fluid flow as related to soil-water-vegetation complexes in erosion control, conservation, drainage, and irrigation.

302 Rainfall, Runoff, and Erosion Control 3(2,3) Precipitation causes, characteristics and distribution are covered. Resulting runoff rates and volumes as influenced by watershed characteristics are studied, including methods of controlling runoff and erosion by vegetative and mechanical means. Sufficient elementary surveying is included to assure proper application of principles in the design of soil and water conservation practices. Not open to students who have completed AGM 301.

303 Calculations for Mechanized Agriculture 3(2,3) Course designed to enhance the student's ability to analyze and solve a wide range of problems requiring engineering technology. Laboratory periods will be used to introduce the student to microcomputer hardware. Basic programming and typical applications to agricultural mechanization problems. *Preq:* PHYS 207 or consent of instructor.

402, 602 Drainage, Irrigation, and Waste Management 3(2,3) Continuation of AGM 302. Basic soil-water-plant relationships are used to determine the need for and methods of irrigation, drainage, and waste management. Topics covered will include irrigation methods, drainage needs, drainage methods, and waste-treatment methods. *Preq:* AGM 302.

404, 604 Farm Structures 3(2,3) Farmstead planning, including space and environmental needs for livestock and poultry. Design of building components and environmental control. *Preq:* PHYS 207 or consent of instructor.

406, 606 Mechanical and Hydraulic Systems 3(2,3) This course deals with power transmission systems for agricultural production with emphasis on mobile equipment. The characteristics, requirements, and design of both V-belt drive and roller chain drives are presented. Emphasis is placed on hydraulic power transmission systems, including pumps, actuators, control devices, and hydraulic circuitry. *Preq:* AGM 206, PHYS 207 or consent of instructor.

408 Equipment Sales and Service 3(3,0) Agricultural equipment sales and service techniques, inventory and accounting procedures followed by the farm machinery industry.

452, 652 Farm Power 3(2,3) A study of tractors with emphasis upon internal combustion engine principles and the support systems necessary for its proper functioning. The application of power, maintenance, adjustment, and general repair are also considered. *Preq:* PHYS 207 or consent of instructor.

460, 660 Farm and Home Utilities 3(2,3) A course for undergradute and graduate students in agriculture and related curricula, involving a study of electric and other utilities on the farm and in the home. Selection, installation, and maintenance of wiring systems, lighting systems, motors, controls, water systems, and waste disposal systems are emphasized. *Preq:* PHYS 208 or consent of instructor. Junior standing.

472 Seminar 1(1,0) The student will be introduced to the agribusiness world, professionalism, current topics of special interest, and financial and legal implications of modern agricultural production. *Preq:* Senior standing in Agricultural Mechanization and Business or consent of instructor

712 Farm Machinery Management 3(2,3)

771 Selected Topics in Agricultural Mechanization 1-3(1-3,0)

781 Special Problems 1-3(1-3,0)

851 Simulation of Agricultural Systems 3(3,0)

AGRICULTURE (AGRIC)

Professors: J. A. Brittain, O. J. Dickerson, J. F. Dickey, R. E. Franklin, R. G. Halfacre, J. W. Hubbard, L. W. Hudson, B. L. Hughes, D. D. Lee, R. J. Mercer, J. H. Rodgers, B. H. Robinson; *Associate Professors:* J. C. McConnell, Jr., S. U. Wallace; *Assistant Professor:* M. A. Hall; *Instructor:* M. E. Richardson

103 Introduction to Animal Industries 3(3,0)F Fundamental and descriptive aspects of the animal industries as applied biology and major segments of food production and distribution systems. The subject matter will be presented by Animal Science, Dairy Science, and Poultry Science Departments.

104, H104 Introduction to Plant Sciences 3(3,0)S A fundamental course in plant sciences, including agronomic and horticultural crops of the major agricultural areas of the world and emphasizing the crops of South Carolina.

105 Agriculture and Society 2(2,0) Examination of the structure, function, and importance of the food and resource base, production, supply, marketing, demand, capital, labor markets, and consumption behavior in the U.S. economic and sociological issues affecting U.S. agriculture.

200 Agricultural Applications of Microeconomics 3(2,2) Provides an overview of microcomputer hardware and software encompassing wordprocessing, spreadsheet, data base management, utility, and communications. It also includes specialized farm and agribusiness management and decision-making programs and criteria for evaluating and selecting hardware.

301 International Agriculture 3(3,0)F Designed to acquaint the student with the systems of agriculture of the world. The approach is evolutionary. Main emphasis is on production as related to world climates and world population. Various geographical areas are considered. *Preq:* AGEC 202 or ECON 211.

401 International Agriculture Seminar 1(1,0)S A colloquium of current issues in world agriculture. Topics include population growth, food policy, technology transfer, and international trade. With permission of instructor, the course may be repeated for a total of two credits.

H491 Senior Honors Research 3(1,6) Senior Division Honors research in an agricultural sciences curriculum. Open to approved Honors Program students only. In consultation with and under the direction of a professor, the student will select a research topic, conduct experiments, record data, and make an oral presentation of results to the College Honors Program Committee.

H492 Senior Honors Research 3(1,6) Continuation of AGRIC H491. Senior Division Honors research in an agricultural sciences curriculum. Upon termination of the research project, the student will submit a formal written report and make a final oral presentation of results to the College Honors Program Committee. Professor-student discussions of additional topics will be arranged.

AGRONOMY (AGRON)

Professors: G. R. Craddock, R. E. Franklin, *Head;* B. J. Gossett, W. D. Graham, Jr., M. W. Jutras, J. A. Martini, J. H. Palmer, V. L. Quisenberry, J. S. Rice, E. A. Rupert, H. D. Skipper, J. R. Woodruff; *Associate Professors:* E. R. Shipe, B. R. Smith, S. U. Wallace; *Assistant Professors:* S. C. Hodges, N. H. Walker

202 Soils 4(3,2)F Introduction to world land resources, soil formation, classification, and mineralogy. Emphasis is placed upon the basic chemical and physical properties of soil. Soil microorganisms, plant nutrients, and fertilization are discussed. Soil properties are related to plant growth. *Preq:* CH 101, 102, or a geology sequence including GEOL 101, or consent of instructor.

350 Practicum 1-3 Preplanned internship undertaken with an approved agency concerned with agronomic practices. Restricted to students with a major or minor in Agronomy. Maximum of three credits allowed. *Preq:* Consent of department head.

402, 602 Land Pollution Control 3(3,0)S. Odd-numbered years. Application of the principles of soil science to the use of land for disposal of pollutants and wastes from an increasing population of animals, plants, and man. Waste utilization, waste disposal methods, and capacity of land to consume wastes will be discussed. *Preq:* AGRON 202, 403, or consent of instructor.

403, 603 Soil Genesis and Classification 2(1,3)F Study of soil morphology and characterization, pedogenic processes, soil-forming factors, and classification of soils. *Preq:* AGRON 202 or consent of instructor.

404, 604 Soils and Land Use 2(1,3)F Soils interpretations for nonagricultural purposes and facilities. Emphasis upon use of modern soil surveys and properties and features of soils important in nonfarm land uses. Not open to Agronomy majors or minors or to students who have had AGRON 202.

405, 605 Plant Breeding 3(2,2)S The application of genetic principles to the development of improved crop plants. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods. *Preq:* GEN 302 or equivalent.

406 Special Problems 1-2(0,3-6) Course designed to acquaint undergraduate students with the scientific method. Literature investigation, planning, and execution of an experiment are integral parts of the course. Not available to AGRIC H491 and H492 students. Maximum of 4 credits allowed. *Preq:* Senior standing as a major or minor in Agronomy and consent of department head.

407, H407, 607 Principles of Weed Control 3(2,2)F Weeds, their introduction, ecology, methods of reproduction, dissemination, and control; chemistry and mode of action of herbicides; equipment and techniques of application; a characterization of the common weeds of the Southeast. Admission to honors section by invitation only. *Preq:* AGRIC 104, AGRON 202, or consent of instructor.

421, 621 Field Crops—Monocots and Specialty Crops 3(3,0)F The principles involved in the production and utilization of corn, wheat, oats, barley, rye, sorghum, rice and the millets, with special emphasis on their importance in South Carolina agriculture. The role of other oil, fiber, seed, drug, sugar, and other crops will be treated from the standpoint of worldwide production and utilization. *Preq:* AGRIC 104, AGRON 202.

422, 622 Field Crops—Dicots 3(3,0)S The principles involved in the production and utilization of cotton, soybeans, tobacco, and peanuts with special emphasis on their importance in South Carolina agriculture. *Preq:* AGRIC 104, AGRON 202.

423, H423, 623 Field Crops—Forages 3(3,0)S The characteristics, establishment, utilization, and maintenance of crops for hay, silage, and pasture. Crops valuable in South Carolina are emphasized. Admission to Honors section by invitation only. *Preq:* AGRIC 104, AGRON 202, or consent of instructor.

424, 624 Advanced Field Crops Laboratory 1(0,2)F Identification and management of the important forage and row crops of the Southeast, nation, and the world. Course is self-tutorial. *Preq:* AGRIC 104.

425, 625 Seed Science and Technology 3(2,2)S Odd-numbered years. Topics include seed development, germination, dormancy, pathology, storage, and deterioration. Seed testing and commercial production of seed are also covered. Emphasis will be placed on useful applications of current seed science knowledge. *Preq:* AGRIC 104, BOT 205.

433, 633 (HORT) Integrated Weed Management for Agronomic and Horticultural Crops 3(3,0) See HORT 433.

446, 646 Soil Management 3(3,0)F Basic soil properties are related to compaction, water and solute movement, and root growth. Practical management problems are considered and solutions developed based upon basic soil characteristics. Problems will include erosion, no-tillage, compaction, irrigation, leaching, waste application, golf-green management, and orchard establishment *Preq:* AGRON 202

452, 652 Soil Fertility and Management 3(3,0)S Soil properties, climatic factors, and management systems in relation to soil fertility maintenance for crop production. Plant nutrition and growth in relation to crop fertilization and soil management *Preq:* AGRON 202 or consent of instructor

453, H453, 653 Soil Fertility Laboratory 1(0,3)S The evaluation and interpretation of soil fertility production. *Preq:* AGRON 202 or consent of instructor

455 Seminar 1(1,0)F Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

456 Seminar 1(1,0)S Student presentation of current topics of special interest in the field of soil science appearing in recent scientific journals and other publications.

475, H475, 675 Soil Physics and Chemistry 3(2,3)S Study of the principles of soil physics and chemistry and their applications Topics include soil texture, structure, compaction, water relations, solute movement, mineral composition, adsorption phenomenon, and soil acidity *Preq:* AGRON 202, CH 101, 112, PHYS 207

490, 690 Soil Organisms in Crop Production 3(2,3)F Even-numbered years Interrelationships of soil organisms, soil properties, and crop production Aspects of biological nitrogen fixation, mycorrhizae, and microbial-pesticide interactions Biochemical and nutrient transformations related to plant growth. *Preq:* AGRON 202, MICRO 305, PLPA 301, or consent of instructor.

801 Crop Physiology and Nutrition 3(3,0)

802 Pedology 3(3,0)

804 Theory and Methods of Plant Breeding 3(3,0)

805 Soil Fertility 3(3,0)

806 Special Problems 1-3(0,3-9)

807 Soil Physics 4(3,3)

808 Soil Chemistry 3(2,3)

810 Soil Microbiology 3(3,0)

812 Crop Ecology and Land Use 3(3,0)

820 Pesticide Residues in the Environment 3(3,0)

825 Seminar 1(1,0)

890 Special Topics in Agronomy 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

AMERICAN STUDIES (AMST)

Assistant Professor: W. Lasser

300 American Culture 3(3,0) Examination of the major works in the field of American studies, emphasizing the genesis, growth, and varied nature of interdisciplinary American writing in the last fifty years. *Preq:* Sophomore standing.

400 Topics in American Studies 3(3,0) Study of selected issues or concerns in American life from an interdisciplinary point of view. *Preq:* Sophomore standing.

ANIMAL PHYSIOLOGY (ANPH)

(See courses listed under Animal Science, Dairy Science, Entomology, Poultry Science, and Zoology)

Professors: B. D. Barnett, J. F. Dickey, J. R. Diehl, D. M. Henricks, B. L. Hughes, R. J. Thurston, D. E. Turk; *Associate Professors:* G. P. Birrenkott, Jr., J. M. Colacino, J. W. Foltz, T. Gimenez, J. C. Spitzer

301 Physiology and Anatomy of Domestic Animals 4(3,3) Physiology and associated anatomy of the body systems, including nervous, skeletal and muscular, respiratory, digestive, circulatory, urinary, reproductive, and endocrine systems. Designed primarily for students in Animal Science, Dairy Science, and Poultry Science. *Preq:* BIOL 103, 104, 105, 106 or 110, 111.

460, H460, 660 Systems Physiology 1(1,0) Physiology of the digestive and endocrine systems. *Coreq:* ZOOL 459 or consent of instructor.

801 Electron Microscopy of Biological Specimens 3(1,6)

802 Special Topics in Animal Physiology 1(1,0)

803 Current Concepts in Endocrinology 3(3,0)

806 Experimental Animal Physiology 3(1,6)

807 Special Problems in Animal Physiology 1-3

808 Mammalian and Avian Endocrinology 3(3,0)

812 Digestive-Metabolic, Excretory and Respiratory Physiology 5(4,3)

814 Membrane, Cardiovascular and Neuro-Muscular Physiology 5(4,3)

851 Animal Physiology Seminar 1(1,0)

991 Doctoral Research. Credit to be arranged.

ANIMAL SCIENCE (ANSC)

Professors: D. L. Cross, J. R. Diehl, D. M. Henricks, L. W. Hudson, *Acting Head,* G. C. Skelley, Jr., C. E. Thompson; *Associate Professors:* T. Gimenez, D. L. Handlin, J. C. McConnell, Jr., J. C. Spitzer; *Assistant Professor:* T. C. Jenkins, *Instructor:* V. C. Coker

202 Introductory Animal Science 3(3,0) Systematic coverage of the basic principles involved in the breeding, feeding, management, and marketing of beef cattle, swine, sheep, and horses.

205 Light Horse Management 2(1,3)F The light horse industry—development of breeds and their uses. Breeding, feeding, and management of light horses. Fundamental instruction in equitation.

209 Animal Science Techniques I 1(0,2)S Basic principles in the handling of livestock and techniques of animal industries are discussed. Basics of animal anatomy, equipment and facilities used in animal production are presented. *Preq:* AGRIC 103 or ANSC 202.

301, H301 Feeds and Feeding 3(3,0)F Feeds, nutrients, digestion, metabolism of feedstuffs, feeding standards, and balancing of rations. *Preq:* AGRIC 103 or ANSC 202 or consent of instructor.

303 Livestock Evaluation I 2(1,2) Modern selection parameters are integrated with visual appraisal in the identification of body traits that will ultimately affect the market grades and economic value of live animals and their carcasses. *Preq:* AGRIC 103 or ANSC 202 or consent of instructor.

305 Meat Grading and Selection 2(1,3)F Even numbered years. Classification, grading and selection of beef, lamb and pork carcasses, and wholesale cuts, and factors influencing quality and value will be studied. Students enrolled in this course are eligible to compete in Intercollegiate Meat Judging Contests. *Preq:* ANSC 202.

306 Livestock Evaluation II 2(1,2) Modern selection parameters are integrated with visual appraisal in the identification of animals to be retained for producing offsprings. *Preq:* AGRIC 103 or ANSC 202 or consent of instructor.

308 Animal Science Techniques II 1(0,2)F Basic principles in the handling of livestock and techniques of animal industries are discussed. Principles of animal care and management for livestock production are emphasized. *Preq:* AGRIC 103 or ANSC 202.

309 Animal Science Techniques III 1(0,2)S Basic principles in the handling of livestock and techniques of animal industries are discussed. Advanced applications of livestock production, principles involving reproduction, economic analysis, etc., are taught. *Preq:* AGRIC 103 or ANSC 202.

310 Animal Disease and Sanitation 2(2,0)S Principles of sanitation; disease prevention and control; common ailments of cattle, swine, and horses; and the nature of the disease process will be explained. *Preq:* ANSC 202.

351 Meat Identification and Utilization 1(0,3) Selection of meat and identification of cuts, processing techniques, nutritive value, meat preservation, research techniques, muscles, and bones.

353, H353 Meats 2(2,0)F The chemical and physical composition of meat, meat hygiene, nutritive value, curing, freezing, and meat by-products. *Preq:* ANSC 202.

355 Meats Laboratory 1(0,2)S The selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing, and freezing of meats. Emphasis is placed on the identification of wholesale and retail cuts *Preq:* ANSC 202.

360 Animal Science Internship 1-6(0,2-12) Preplanned internship under competent supervision in an approved agency concerned with Animal Science endeavors The student will submit periodic reports and conduct a seminar *Preq:* Junior standing in Animal Science and consent of instructor.

401, H401, 601 Beef Production 3(3,0)F Breeding, feeding, management, and grading of beef cattle. Emphasis is placed on year-round grazing *Preq:* ANSC 301 or consent of instructor.

405 Advanced Livestock Selection and Evaluation 1(0,3)F, Odd-numbered years. Continuation of ANSC 306 for students who are interested in participating in judging contests or in receiving special training in the selection of breeding cattle, sheep, and swine. Judging and grading of market classes are considered *Preq:* ANSC 306.

406 Seminar 2(2,0)F Special problems in animal production. Each student is given a subject on which he makes weekly reports before a seminar group. *Preq:* ANSC 301 or consent of instructor.

408, H408, 608 Pork Production 3(3,0)S Feeding, breeding, management, and marketing of hogs. Emphasis is placed on winter and summer forages, protein supplements, mineral mixtures, and sanitation practices. *Preq:* ANSC 301 or consent of instructor.

412, H412 Horse Production 3(3,0)S Feeding, breeding, and management of the horse discussed in relationship to health, genetics, reproduction, nutrition, and selection. *Preq:* ANSC 301 or consent of instructor.

422 Special Problems 1-3(0,3-9) Topics of interest to the student during the junior or senior year. The course will give experience with livestock problems not covered in other courses. *Preq:* Junior or Senior standing, consent of department head and instructor.

452, H452, 652 Animal Breeding 3(3,0)S The fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, linebreeding, inbreeding, crossbreeding, and other related subjects. *Preq:* GEN 302.

802 Topical Problems 1-3(1-3,0)

803 Meat Technology 3(3,0)

804 Methods in Animal Breeding 3(3,0)

805 Nutrition of Meat Animals 3(3,0)

891 Master's Research. Credit to be arranged.

ANTHROPOLOGY (ANTH)

201 Introduction to Anthropology 3(3,0) Humans as biosocial animals, including the theory of evolution and the archaeological evidence of physical and cultural development; emphasis on the relation of human beings to the environment.

301 Cultural Anthropology 3(3,0) The nature of human culture; the constants and variants in human behavior affecting technology, social relations, social control, family systems, language, religion and art. *Preq:* ANTH 201 or consent of instructor.

310 Archaeology of the Southeastern American Indians 3(3,0) The cultural prehistory of the Southeastern United States, including developments in each time period; evidence of intra- and interregional trade, agriculture, and societal complexity. *Preq:* ANTH 201 or consent of instructor.

320 North American Indian Cultures 3(3,0) American Indian ethnography, using the culture-area approach in studying adaptations of native peoples; includes a brief survey of American Indians today. *Preq:* ANTH 201 or consent of instructor.

ARCHITECTURAL STUDIES

ARCHITECTURE (CAAR)

Professors: D. L. Collins, T. K. Doruk, J. D. Jacques, P. R. Lee, H. E. McClure, G. C. Means, Jr., R. B. Norman, K. J. Russo, *Head;* G. B. Witherspoon; *Associate Professors:* L. G. Craig, M. A. Davis, R. D. Eflin, R. J. Hogan, N. J. Hurt, D. J. Hutton, Y. Kishimoto, G. W. Patterson, G. M. Polk, Jr., G. L. Walker; *Visiting Associate Professor:* H. C. Harritos; *Visiting Assistant Professor:* V. D. Lane; *Adjunct Professor:* F. G. Roth

201 The Art of Architecture 3(0,6) Examines basic concepts of architectural design from historical models to contemporary examples. Seminar discussions complement studio exercises and projects which concentrate on principles of design, materials of construction, programmatic concerns, and design theories. *Preq:* CADS 151 and 153; 152 and 154.

202 Art with Architecture 3(0,6) Course will emphasize the integration of art with architecture. Seminar discussions and field trips examine key examples from the past and present. Studio projects and exercises utilize the principles of design to creatively solve design problems of art in public places. *Preq:* CAAR 201.

351 Design Studies in Architecture V 6(0,14) Studio work with adjunct demonstrations and lectures concerned with intermediate architectural design problems. *Preq:* CADS 252, 254.

352 Design Studies in Architecture VI 6(0,14) Continuation of CAAR 351. *Preq:* CAAR 351.

421 Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental and technological considerations in architecture and the building industry. *Preq:* Senior standing or consent of instructor.

424, 624 Product Design 3(0,9) Furniture and product system design with emphasis on ergonomics and the relationship of form and materials. *Preq:* Senior standing and consent of instructor.

425, 625 Energy in Architecture 3(3,0) Climate design methodology and its influence on building energy patterns and architectural form. *Preq:* Senior standing and consent of instructor.

426, 626 Architectural Color Graphics 3(2,3) Architectural color graphics by computer. Theories of color classification and interaction; application of color theories to art and architecture. *Preq:* Consent of instructor.

451 Design Studies VII 6(0,14) Studio work with adjunct seminar/lecture concerned with advanced architectural design problems. *Preq:* CAAR 352.

452 Design Studies VIII 6(0,14) Continuation of CAAR 451. *Preq:* CAAR 451.

481, 681 Professional Practice 3(3,0) Examination of ethical, legal, and business issues in the architectural profession. *Preq:* Professional degree program status.

485, 685 Health Care Facilities Systems 3(3,0) Course introduces the concepts, organization, and direction of health and health-care facilities within the context of health-care delivery systems. Special emphasis is placed on mental and physical health-care facilities concepts. *Preq:* Consent of instructor.

488, 688 Health Care Facilities Programming Techniques 3(3,0) Seminar on recent research and innovations in health-care facilities programming, and original investigation of assigned programming problems. *Preq:* Consent of instructor.

490, H490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in architecture. *Preq:* Consent of department head.

557 Architecture Studio 6(0,18) City planning design and the development of complex building solutions.

558 Architecture Studio 6(0,18) The programming and solution of complex building design problems including interior and site development. *Preq:* CAAR 557

801 Architecture Seminar 3(3,0)

802 Phenomenology of Architecture 3(3,0)

803 Theories of Architecture 3(3,0)

804 Modern Masters 3(3,0)

805 Architecture and the City 3(3,0)

853 Architecture Studio 6(0,18)

854 Architecture Studio 6(0,18)

857 Architecture Studio 6(0,18)

858 Thesis Research 3(0,9)

859 Thesis Manuscript 3(0,9)

886 Health Care Components 3(3,0)

890 Directed Studies 1-5(1-5, 0)

891 Thesis Project 9(0,27)

ARCHITECTURE OVERSEAS PROGRAM (CAGE)

Professor: C. Fera, *Director;* J. L. Young, *Professor-in-Residence*

The Daniel Center for Urban Studies in Genoa, Italy, is available to qualified Building Science and Management students with Senior standing. Studio and classroom work in this historic port setting is enriched by visiting scholars and complemented by scheduled field trips, both in Italy and continental Europe.

412, 612 Architectural History Research 3(3,0) Directed investigations related to the art and architectural heritage of Italy.

426, 626 Design Seminar 3(3,0) Exploration of topical issues in architecture, art, construction, and planning.

432, 632 Field Studies in Architecture and Related Arts 3(0,9) Documentation and analysis of architectural structures observed during European travels in graphic and written form.

550 Architecture Studio 6(0,18) Architectural design studies in context of the Genoa urban setting.

850 Architecture Studio 3-6(0,9-18)

860 Planning Studio 3-6(0,9-18)

880 Visual Arts Studio 3-6(0,9-18)

ART AND ARCHITECTURAL HISTORY (CAAH)

Professors: H. N. Cooledge, Jr., E. C. Voelker; *Associate Professor:* J. B. Mulholland; *Visiting Assistant Professor:* R. L. Moffa; *Adjunct Professor:* R. D. England

115 History of Art and Architecture I 3(3,0) Total environment: its demands and restrictions as evidenced by the building and planning of men from ancient time to the present.

116 History of Art and Architecture II 3(3,0) Continuation of CAAH 115. *Preq:* CAAH 115.

215 History of Art and Architecture III 3(3,0) Cultural focus: its problems and expression as evidenced by selected examples of architecture and planning from ancient times to the present, considered in depth. *Preq:* CAAH 116.

216 History of Art and Architecture IV 3(3,0) Continuation of CAAH 215. *Preq:* CAAH 215.

303 Evolution of Visual Arts I 3(3,0) A consideration of man's necessity for and development of the visual arts in the Western World from ancient times to the Renaissance. Illustrated lectures and collateral reading.

304 Evolution of Visual Arts II 3(3,0) Development and utilization of the visual arts in the Western World from the Renaissance through modern times; illustrated lectures and collateral reading.

305 Contemporary Art History 3(3,0) Study of contemporary art from World War II to the present, exploring the forces that have shaped the various movements and directions. *Preq:* CAAH 216.

391 Italian Studies Abroad 6(12,0)SS On-site exposure of specific art works and architectural monuments. Study of museum collections and historic structures. Lectures scheduled in Milan, Veneto area, Venice, Ravenna, Rimini, Ancona, Split, Yugoslavia, return to Italy via Bari, Greek ruins at Paestum, Pompeii, Rome and environs, Florence and environs, Genoa and environs. Offered pass/fail only. *Preq:* CAAH 115, 116 or 303, 304.

403, 603 History of Modern Architectural Movement 3(3,0) A seminar in the analysis and criticism of architectural and town building works. The course sequence will include historic and contemporary examples, literary searches, field trips, essays, and oral reports. *Preq:* Senior standing or consent of instructor.

404, 604 Current Directions in Architecture 3(3,0) The critical analysis of the development and current directions of modern movements in architecture. *Preq:* Senior standing or consent of instructor.

405, 605 History of Planning and Cities 3(3,0) This course is intended to familiarize professional students in the environmental design disciplines concerning the origin, development, and growth of cities to enable them to understand the ever accelerating growth of urbanism and the increasing complexity of urban organism. *Preq:* Consent of instructor or department head.

411, 611 Directed Research in Art and Architectural History 3(3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis will be placed on field studies, research activities, and current developments in art history.

412, 612 Directed Research in Art and Architectural History 3(3,0) Continuation of CAAH 411.

413, 613 Twentieth Century Visual Arts 3(3,0) Consideration of the visual arts in the 20th century in relation to the factors that have influenced the artist and the consequence of his/her production to society.

416 History of Landscape Architecture 3(3,0) Planetary survey of notable examples of mankind's constant efforts to arrange and bring order to his environment by design on the land. *Preq:* Junior standing or consent of instructor.

417, 617 Studies in the Art and Architecture of the Ancient World I 3(3,0) Consideration of the visual arts and architectural monuments of the Ancient World (Egypt, the Near East, Greece, and Rome) with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor.

418, 618 Studies in the Art and Architecture of the Ancient World II 3(3,0) Consideration of the visual arts and architectural monuments of the Ancient World (Egypt, the Near East, Greece, and Rome), with a study in depth of selected examples from the period. *Preq:* CAAH 417.

419, 619 Studies in the Art and Architecture of the Early Middle Ages 3(3,0) Consideration of the visual arts and architectural monuments of the Early Middle Ages (Byzantium and Western Europe from the 4th through 12th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor.

420, 620 Studies in the Art and Architecture of the Late Middle Ages 3(3,0) A consideration of the visual arts and architectural monuments of the Late Middle Ages (Western Europe from the 12th through the 15th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 419.

423, 623 Studies in the Art and Architecture of the Renaissance I 3(3,0) A consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 216 or consent of instructor

424, 624 Studies in the Art and Architecture of the Renaissance II 3(3,0) Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th through the 18th centuries), with a study in depth of selected examples from the period. *Preq:* CAAH 423.

425, 625 Architecture of the Technical Revolution 1685-1865 3(3,0) Consideration, in depth and particular, of the impact upon architecture of the applied scientific method as it produced mechanical inventions, new construction material and methods, new power sources and production technique, and the social adjustments which all of these initiated. *Preq:* CAAH 216 or consent of instructor.

427, 627 Eighteenth Century Visual Arts 3(3,0) A consideration of the visual arts: sculpture, painting, graphics, and furnishings of the 18th century in its environment, together with its precursors and later influence (1785-1815). *Preq:* CAAH 216.

428 628 Nineteenth Century Visual Arts 3(3,0) Consideration of the visual arts of the 19th century: painting, sculpture, printmaking, ceramics, and so forth, in relation to the factors that have influenced the artist and his/her consequence on society *Preq:* CAAH 427.

429, 629 Studies in the Art and Architecture of India and the Far East 3(3,0) Consideration of the visual arts and architectural monuments of India and the Far East, with a study in depth of selected examples from the period *Preq:* CAAH 216 or consent of instructor

815 Art and Architectural History Seminar I 3(3,0)

816 Art and Architectural History Seminar II 3(3,0)

BUILDING SCIENCE (CABS)

Professors: C. L. Addison, N. L. Book, L. H. Brown, R. E. Knowland, *Head; Associate Professors:* M. D. Egan, F. M. Eubanks, J. A. Kaufmann, R. W. Liska, S. D. Schuette

201 Structures I 3(3,0) Study of statically determinate structures including force applications and distributions in structural elements and the resulting stress-strain patterns in axial, shear and bearing mechanisms. *Preq:* MTHSC 106.

202 Structures II 3(3,0) Study of the force distribution in statically determinate structures and structural elements including moments and shear stress, combined loading/stress conditions and deflections. *Preq:* CABS 201

203 Materials and Methods of Construction 3(3,0) Theory and principles of building construction with an overview of how the major components of a building fit together and the rationale behind their construction. *Preq:* Sophomore standing.

204 Contract Documents 3(2,3) Introduction to working drawings, specifications, and the various documents required to carry out a typical construction project.

301 Structures III 3(3,0) Theory, analysis, and design of statically determinate steel and wood-structural components and systems; and introduction to reinforced concrete and reinforced masonry structures and systems. *Preq:* CABS 202.

302 Structures IV 3(3,0) Theory, analysis and design of statically indeterminate steel, wood, and reinforced concrete structural components and systems and related structural concepts. *Preq:* CABS 301.

303 Soils and Foundations 3(2,3) Various types of soil will be studied, including related activities of testing, compaction, stability, and function. Various types of foundations will also be studied.*Preq:* CABS 202.

304 Environmental Systems I 3(3,0) Theory of heating, ventilating, air conditioning, electrical lighting and plumbing systems as related to buildings *Preq* Junior standing

351 Construction Management I 3(0,9) Basic estimating as applied to construction projects. Includes the take-off of material quantities, assigning labor equipment production rates, and applying material prices, wage rates and equipment costs to derive a total job cost *Preq* CABS 204

352 Construction Management II 3(0,9) Analysis of construction projects with emphasis on estimating, scheduling and resource leveling *Preq* CABS 204 and 351

401 Formwork and Placing Concrete 3(3,0) Study of the design and construction of concrete formwork and designing and placing concrete *Preq* CABS 202

402 Heavy Construction Equipment 3(3,0) Selection, financing and management of construction equipment *Preq* CABS 461

403 Environmental Systems II 3(3,0) Theory of acoustical design and control, illumination and life safety in buildings *Preq* Junior standing

451 Construction Management III 3(0,9) Study of labor-management relations in the construction industry, field organization, subcontractor relationships, supervision, safety, and productivity *Preq* CABS 352

452 Construction Management IV 3(0,9) Study of construction business organization, policy, financial management, project management, and cost control *Preq* CABS 451

461, 661 Construction Economic Seminar 3(3,0) Studies in urban and building economics *Preq* Senior standing

471, 671 Architectural Structures 3(3,0) Examination and evaluation of structural systems with emphasis on the compatibility and constraints exerted on architectural design goals *Preq* CABS 302

472, 672 Architectural Structures 3(3,0) Continuation of CABS 471 *Preq* CABS 471

475, 675 Building Equipment and Systems 3(3,0) Study of the selection and integration of building of support systems with other systems heating, ventilation, air conditioning, electrical, and plumbing *Preq* CABS 403 or equivalent as approved by instructor

476, 676 Design for Natural Hazards 3(3,0) Basic principles of design for natural hazards to the built environment Wind (hurricane, tornado, cyclone), water (flood, seiche, tsunami), seismic (shaking, faulting, landslide, liquefaction) and fire (vegetation, exposing structures, lightning) Weather characteristics and geological conditions, site and land-use planning, and hazard forces and hazard resistant design fundamentals *Preq* CABS 403

490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses Emphasis will be placed on field studies, research activities, and current development in building science *Preq* Consent of instructor

852 Construction Management Research 3(0,9)

854 Building Systems Research 3(0,9)

855 Building Environmental Systems Seminar 3(3,0)

881 Professional Seminar 3(3,0)

890 Directed Studies 3-6

891 Master's Research 9(0,27)

INTERDISCIPLINARY STUDIES (CADS)

151 Design Studies I 2(0,6) Introduction to problem-solving methodology for environmental design through studio exercises, projects, and reviews *Coreq* CADS 153, admission to the College of Architecture

152 Design Studies II 2(0,6) Continuation of CADS 151 *Preq* CADS 151 *Coreq* CADS 154

153 Design Theory I 2(2,0) Introduction to concepts and principles of architecture, visual arts, landscape architecture, urban and regional planning, and construction management *Coreq* CADS 151

154 Design Theory II 2(2,0) Continuation of CADS 153. *Coreq:* CADS 152.

251 Design Studies III 3(0,9) Studio work with adjunct demonstrations and lectures concerned with basic architectural design problems. *Preq:* CADS 152. *Coreq:* CADS 253.

252 Design Studies IV 3(0,9) Continuation of CADS 251. *Preq:* CADS 251. *Coreq:* CADS 254.

253 Design Theory III 3(2,3) Introduction to the theory and fundamentals of the built environment. Lectures and seminars will cover design process, basic materials and structural systems, site analysis, energy-efficient design, case studies, and graphics techniques. *Coreq:* CADS 251

254 Design Theory IV 3(2,3) Continuation of CADS 253 with introduction to psychological and social influences, building codes, case studies, preservation and restoration, design and form determinants, with emphasis on context. *Coreq:* CADS 252.

LANDSCAPE ARCHITECTURE (CALA)

262 Landscape Architectural Technology I 3(2,3) Lecture/studio course on the technologies aspects of landscape architecture including design grading and drainage, site information gathering and analysis, horizontal and vertical alignments of walks and roadways, structure of landscape architecture, irrigation design, pools and fountains, and lighting. *Preq:* CADS 251 and sophomore standing.

351 Design Studies in Landscape Architecture V 6(0,14) Studio work with adjunct demonstrations and lectures concerned with intermediate landscape architectural design problems. *Preq:* CADS 252, 254.

352 Design Studies in Landscape Architecture VI 6(0,14) Continuation of CALA 351. *Preq:* CALA 351

362 Landscape Architectural Technology II 3(2,3) Continuation of CALA 262. *Preq:* CALA 262. *Coreq:* CALA 351.

421 Landscape Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental, technological and theoretical issues in landscape architecture, land planning, and urban design. *Preq:* Senior standing or consent of instructor

451 Design Studies in Landscape Architecture VII 6(0,14) Studio work with adjunct demonstrations and lectures concerned with advanced landscape architectural design problems. *Preq:* CALA 352.

452 Design Studies in Landscape Architecture VIII 6(0,14) Continuation of CALA 451. *Preq:* CALA 451.

462 Landscape Architectural Technology III 3(2,3) Continuation of CALA 362. *Preq:* CALA 362.

490 Directed Studies and Projects in Landscape Architecture 1-5(0,3-15) Comprehension studies and/or research of special topics not covered in architectural courses. *Preq:* Junior standing and consent of department head.

552 Professional Landscape Architectural Design 6(0,14) Complex problem-solving projects involving regional design analysis and planning, city planning and urban design, building complex relationships, and intense site utilization and design.

562 Landscape Architectural Technology IV 2(0,6) Studio course for the integration of design and technology. *Preq:* CALA 462, professional standing. *Coreq:* CALA 552.

581 Landscape Architectural Professional Practice 3(3,0) Lecture course dealing with general consideration of landscape architectural office procedures. Study of the professional relationships of the landscape architects to client and contractor including problems of ethics, law, and business. *Preq:* Professional standing or consent of instructor.

PLANNING STUDIES (CAPL)

Professor: G. E. Varenhorst, *Associate Professors:* J. R. Caban, *Acting Head;* B. C. Nocks, *Visiting Associate Professor:* M. Foster, *Visiting Assistant Professor:* D. L. Faoro, *Adjunct Professor:* E. L. Falk

411, 611 Introduction to City and Regional Planning 3(3,0) The purpose of the course is to introduce students from a variety of disciplines to City and Regional Planning. Spatial and nonspatial areas of the discipline will be explored through a wide ranging lecture/seminar program. *Preq:* Consent of instructor or department head.

415, 615 Small City and Rural Planning 3(3,0) Examines current and future aspects and challenges of small urban centers and rural areas. Course may focus on a wide range of subjects—design, economic, social, political, physical, natural resources, and environmental—depending on the emphasis at the time.

472, 672 Implementation of the Local Planning Process 3(3,0) Organization and administration of types of planning agencies and their relationship to other governmental and private organizations. An examination of the various implementing tools (e.g., zoning, subdivision regulations, covenants, others) available to local government with emphasis on the partnership between the private and public sector. *Preq:* Consent of instructor.

473, 673 Government and Planning Law 3(3,0) Complete coverage of the laws and ordinances relating to redevelopment, subdivision control, zoning, official mapping, and other topics including interpretation, philosophy, enabling legislation and model ordinances. The legal basis of current and long range planning policy will be discussed. *Preq:* Consent of instructor or department head.

483, 683 Seminar on Planning Communication 3(3,0) Informal means open for plan implementation. The organization of effective public information and education programs, use of citizen advisory committees, and application of other implementation techniques. *Preq:* Consent of instructor or department head.

812 City and Regional Planning Theory 3(3,0)

821 Intergovernmental Relations in the Planning Process 1-3(1-3,0)

822 Urban Systems and Design 3(3,0)

823 Social, Planning and Delivery Systems 3(3,0)

831 Principles of Site Planning and Design 3(3,0)

832 Problems in Site Planning 3(1,2)

853 Comparative Studies in Planning Methods and Analysis 3(0,9)

854 Planning and Built Form Studies Studio 3(0,9)

858 Preliminary Planning Thesis 3(0,9)

859 Planning Terminal Project 3(0,9)

862 Citizen Participation in Planning 3(3,0)

863 Urban and Metropolitan Planning Studies Studio 3-6(0,9-18)

865 Advanced Landuse and Built Form Studies Studio 3-9(0,9-27)

871 Seminar on Planning and Management of Change 3(3,0)

881 Quantitative Methods and Urban Planning Policy 3(3,0)

882 Seminar in Mathematical Modeling for Urban and Regional Planning 3(3,0)

883 Techniques for Analyzing Development Impacts 3(0,9)

884 Public Services and Facilities Planning 3(3,0)

885 City and Regional Financial Planning 3(3,0)

889 Selected Topics in Planning 3(3,0)

890 Directed Studies in City and Regional Planning 1-5(0,1-5)

891 Planning Thesis 3-9

893 City and Regional Planning Internship 6(0,6)

VISUAL ARTS (CAVA)

Professors: J. T. Acorn, *Head;* R. H. Hunter, I. G. Regnier, S. Wang; *Associate Professors:* T. Dimond, M. R. Hudson, J. A. Stockham, M. V. Vatalaro; *Assistant Professor:* S. A. Cross

203 Visual Arts Studio 3(0,6) Studio projects in basic visual elements and principles. The development of creative design process, visual organization, and design skills are introduced as a foundation for further study in the visual arts.

205 Beginning Drawing 3(0,6) A study of drawing based on the premise that drawing is a foundation discipline in the visual arts. Basic materials and approaches associated with drawing are studied and applied through studio practice augmented by critiques, demonstrations, and lectures. *Preq:* CADS 152 or CAVA 203

207 Beginning Painting 3(0,6) Introduction to the basic materials, methods and techniques of painting. The primary medium used is acrylic and other painting media may also be introduced. Emphasis is placed upon the basic skills in painting plus individual creative development. *Preq:* CADS 152 or CAVA 203.

209 Beginning Sculpture 3(0,6) Studio projects in the basic additive and subtractive techniques of sculpture. Emphasis on individual creative development in sculpture and a foundation in the processes of modeling, carving, construction and mold making. *Preq:* CADS 152 or CAVA 203.

211 Beginning Printmaking 3(0,6) Studio course designed to introduce basic techniques of relief printing, intaglio, lithography, silkscreen, and papermaking. Each semester concentrates on two or three of these techniques. Coursework integrated printmaking processes and creativity. *Preq:* CADS 152 or CAVA 203.

213 Beginning Photography 3(0,6) Introduction to the use of photography as an art medium. Lectures and studio work cover the utilization of the camera, processing, and printing in black and white, with emphasis on perception and creative expression. *Preq:* CADS 152 or CAVA 203.

215 Beginning Graphic Design 3(0,6) Introduction to the fundamental techniques, concepts and principles of visual communication. Through a series of projects and studio work, students will explore techniques of communication through the use of type design, typography, photography, illustration, symbolism, and product design. Individual creative development will be stressed. *Preq:* CADS 152 or CAVA 203.

217 Beginning Ceramics 3(0,6) Basic studio course introducing ceramic arts through its various processes and techniques. Handbuilding methods as well as throwing on the potter's wheel are developed. Weekly projects emphasize imagination, self-expression, and skill development. Ceramic history is introduced through slide lectures. *Preq:* CADS 152 or CAVA 203.

305 Drawing 3(0,6) Study of human figure drawing with primary emphasis upon drawing from live models. The student's drawing skills and fundamental understanding of the structure and form of the human figure are reviewed through studio practice augmented by critiques, demonstrations, and lectures. *Preq:* CAVA 205 or consent of instructor.

307 Painting 3(0,6) Continuation of CAVA 207 with increased emphasis on personal expression and growth in technical competence. Some study of painting history is included in studio activity. *Preq:* CAVA 207 or consent of instructor.

309 Sculpture 3(0,6) Continuation of CAVA 209 with increased emphasis on creative concepts and more advanced techniques. Introduction to metal casting, metal fabrication, the use of plastics, and wood lamination. *Preq:* CAVA 209 or consent of instructor.

311 Printmaking 3(0,6) Continuation of processes in beginning printmaking with an emphasis on expanding the range and depth of technique. The relationship of technique and process to creative idea development is emphasized. *Preq:* CAVA 211 or consent of instructor.

313 Photography 3(0,6) Continuation of CAVA 213. Advanced techniques and more diverse types of film and paper are used in making images of personal and expressive nature. The design and construction of a view camera, printing in color, and multiple imagery may also be included. *Preq:* CAVA 213 or consent of instructor.

315 Graphic Design 3(0,6) Continuation of concepts and techniques introduced in CAVA 215 with emphasis on more applied projects. Individual creative solutions are emphasized. *Preq:* CAVA 215 or consent of instructor.

317 Ceramic Arts 3(0,6) Continuation of skill development leading to more challenging projects and independent efforts. Further exposure to ceramic history, and ceramic technology are presented. *Preq:* CAVA 217 or consent of instructor.

405, 605 Advanced Drawing 3(0,6) Advanced level studies of drawing which explore the synthesis of refined drawing skills and philosophies of art. The student's understanding of drawing as a form of art is developed through studio practice augmented by critiques, demonstrations, lectures, field trips, and independent research. *Preq:* CAVA 305 or consent of instructor.

407, 607 Advanced Painting 3(0,6) Advanced studio course in painting. Student selects painting media and is expected to develop a strong direction based upon prior painting experience. Study of contemporary painters and directions are included. *Preq:* CAVA 307 or consent of instructor.

409, 609 Advanced Sculpture 3(0,6) Advanced work in sculpture covering the use and combination of all basic materials and processes as covered in CAVA 209, 309. Individualized studio work with opportunity for interdisciplinary study. *Preq:* CAVA 309 or consent of instructor.

411, 611 Advanced Printmaking 3(0,6) Culmination of process, techniques, and individual development. Students are expected to have mastered process and technique for the benefit of the image produced. Creativity and self-expression are highly emphasized as students select a process for concentrated study. *Preq:* CAVA 311 or consent of instructor.

413, 613 Advanced Photography 3(0,6) Continuation of CAVA 313. Advanced problems in photography. *Preq:* CAVA 313 or consent of instructor.

415, 615 Advanced Graphic Design 3(0,6) Continuation of CAVA 315. Personal expression through communication techniques will be further explored. Individual projects will be emphasized. *Preq:* CAVA 315 or consent of instructor.

417, 617 Advanced Ceramic Arts 3(0,6) Students are directed toward further development of ideas and skills. Glaze calculation and firing processes are incorporated to allow for a dynamic integration of form and ideas. *Preq:* CAVA 317 or consent of instructor.

471 Bachelor of Fine Arts Senior Project I 5(0,15) Individual studio project directed by an instructor and determined by the student in consultation with the instructor, usually focused upon a particular studio area, concept, or theme. *Preq:* Senior standing.

472 Bachelor of Fine Arts Senior Project II 5(0,15) Continuation of CAVA 471 that strengthens the student's skills and knowledge of a particular area of interest in the visual arts. *Preq:* CAVA 471, senior standing.

490, 690 Directed Studies 1-5(0,2-10) Study of areas in the visual arts that are not included in other courses or advanced work in addition to other courses. Directed studies must be arranged with a specific professor prior to registration.

850 Visual Arts Studio 3(0,9)

851 Visual Arts Studio 3-6(0,9)

870 Visual Arts Studio 6(0,16)

871 Visual Arts Studio 3-6(0,8-16)

880 Visual Arts Studio 3-15(0,6-30)

891 Master's Research 3-15(0,6-30)

ASTRONOMY (ASTR)

Professors: B. B. Bookmyer, J. R. Ray; *Associate Professors:* T. F. Collins, P. J. Flower

101 Solar System Astronomy 3(3,0) A descriptive survey of the universe, with emphasis on basic physical concepts and the objects in our solar system, is presented. Related topics of current interest will be included For nonscience majors. This course may not be taken by a student who has completed ASTR 301

102 Stellar Astronomy 3(3,0) A descriptive survey of the universe, with emphasis on basic physical concepts and galactic and extragalactic objects, is presented Related topics of current interest will be included. For nonscience majors. This course may not be taken by a student who has completed ASTR 302

103 Solar System Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 101 Demonstrations, laboratory exercises, planetarium visits, and a night laboratory, using a small telescope, will supplement the lecture course *Coreq:* ASTR 101

104 Stellar Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 102 Demonstrations, laboratory exercises, planetarium visits, and a night laboratory, using a small telescope, will supplement the lecture course *Coreq:* ASTR 102

301 General Astronomy 3(3,0) Study of the basic physical concepts necessary for an understanding of the sun, planets, moons, asteroids, and comets that constitute our solar system and of their formation and evolution. *Preq:* MTHSC 106 and PHYS 207 or 122 or consent of instructor

302 Astrophysics 3(3,0) Basic physical concepts necessary for an understanding of our stellar system and the observable universe beyond our galaxy Topics include stellar evolution, galactic structure and an introduction to cosmology *Preq:* MTHSC 106 and PHYS 208 or 221 or consent of instructor

401, 601 Stellar Atmospheres 3(3,0) Introduction to the theory of stellar atmospheres. Topics to be discussed include radiation laws, theory of continuum radiation and spectral line formation, radiation transfer, and stellar spectra Applications to the sun and stars will be presented *Preq:* ASTR 302 or consent of instructor

402, 602 Stellar Interiors and Evolution 3(3,0) Introduction to both the theoretical and observational approaches to the study of stellar evolution. The physical laws governing the temperature, pressure, and mass distributions in stars, including the equation of state, opacity and nuclear energy generation, will be described. Stellar evolution from pre-main sequence stars to post-red giant or supergiant stars will be studied. *Preq:* ASTR 302 or consent of instructor.

403, 603 Galactic Structure 3(3,0) Introduction to the kinematics, dynamics, and content of the Milky Way galaxy Topics include galactic rotation and mass determination, galactic distance scale, stellar populations, galactic center, spiral structure, and evolution of the galaxy *Preq:* ASTR 302 or consent of instructor.

410, 610 Cosmology 3(3,0) Study of the large-scale structure of the universe. Discussion of experimental results includes optical, microwave, and radio observations of galaxies and quasi-stellar objects. Evolutionary models that agree with current observations are discussed. *Preq:* ASTR 302 or consent of instructor.

412, 612 Practical Astronomy 3(3,0) Instruction in the techniques of data reduction and analysis, including discussions of instrumental and observational errors. Various methods of orbital solution will be applied to observations of visual, spectroscopic, and eclipsing binary systems. *Preq:* ASTR 302 or consent of instructor.

475, 675 Selected Topics in Astrophysics 1-3(0-3,0-9) Comprehensive study of an area of astrophysics. Areas to be studied may include nucleosynthesis and stellar evolution, extragalactic distance scale, structure and evolution of galaxies, and large-scale structure of the universe. May be taken for credit more than one time. *Preq:* ASTR 302 or consent of department head.

701 Solar System Astronomy for High School Teachers 3(3,0)

711 Stellar Astronomy for High School Teachers 3(3,0)

730 Earth Science V: Astronomy for High School Teachers 3(3,0)

731 Earth Science VI: Special Topics in Astronomy 1(0,2)

732 Astronomy for Earth Science Teachers 3(3,0)

875 Seminar in Contemporary Astronomy 1-3(1-3,0)

BIOCHEMISTRY (BIOCH)

Professors. C. S. Brown, D. M. Henricks, G. L. Powell, J. M. Shively, J. K. Zimmerman, *Associate Professor.* R. H. Hilderman, *Assistant Professors.* A. G. Abbott, J. P. Weinstein

101 Molecules and Man 1(1,0) Introduction to the structure and function(s) or effect(s) of some biological molecules important to man. *Preq.* Limited to freshmen or by consent of instructor.

102 Molecules and Man 1(1,0) Continuation of BIOCH 101. *Preq.* Limited to freshmen or by consent of instructor.

210 Elementary Biochemistry 4(3,3) Discussion of the kinds of compounds found in living organisms, their biochemical reactions and significance. The laboratory work parallels classroom study. *Preq.* CH 102 or 112.

301 General Biochemistry 3(3,0) Introduction to the nature, production, and replication of biological structure at the molecular level and its relation to function. *Preq:* Organic Chemistry.

302 Molecular Biology Laboratory 1(0,3) Laboratory to accompany BIOCH 301. An introduction to fundamental laboratory techniques in biochemistry and molecular biology and a demonstration of some of the fundamental principles of molecular biology discussed in BIOCH 301. *Preq:* Organic chemistry. *Coreq:* BIOCH 301.

406, 606 Physiological Chemistry 3(3,0) Chemical basis of the mammalian physiological processes of muscle contraction, nerve function, respiration, kidney function, and blood homeostasis is studied. Composition of specialized tissue such as muscle, nerve, blood and bone, and regulation of water, electrolytes and acid-base balance is discussed. *Preq:* BIOCH 210 or organic chemistry.

408, 608 Physiological Chemistry Laboratory 1(0,3) Experiments will be conducted that illustrate biochemical methodology. The use of radioisotopes, chromatography, and procedures used in the clinical biochemical laboratory will be emphasized. *Preq:* Registration in BIOCH 406.

423, 623 Principles of Biochemistry 3(3,0) Study of the chemistry of amino acids, monosaccharides, fatty acids, purines, pyrimidines and associated compounds leads to an understanding of their properties and the relationship between structure and function that make them important in biological processes. The use of modern techniques is stressed. *Preq:* CH 224 or equivalent.

424, 624 Principles of Biochemistry 3(3,0) Continuation of BIOCH 423.

425, 625 General Biochemistry Laboratory 1(0,3) Experiments selected to illustrate current methods used in biochemical research.

426, 626 General Biochemistry Laboratory 1(0,3) Continuation of BIOCH 425.

431, H431, 631 Physical Approach to Biochemistry 3(3,0) Study of chemical and physical properties of amino acids, lipids, nucleic acids, sugars and their biopolymers. Physical and mathematical analyses will be correlated with biological structure and function. *Preq:* Organic chemistry and one semester of physical chemistry.

432, H432, 632 Biochemistry of Metabolism 3(3,0) Study of the central pathways of carbohydrate, lipid, protein, and nucleic acid metabolism. Bioenergetics, limiting reactions, and the regulation and integration of the metabolic pathways will be emphasized. *Preq:* BIOCH 431 or consent of instructor.

441, H441, 641 Molecular Biology 3(3,0) Course dealing with the principles of replication, transcription, and translation. Emphasis will be placed on the experimental data used to study these principles. *Preq:* BIOCH 423 and 424 or 431 or consent of instructor.

491, H491 Special Problems in Biochemistry 1-8(0,3-24) Orientation in biochemical research, i.e., experimental planning, execution, and reporting. May be repeated for a maximum of 8 credits.

810 Advanced Biochemical Techniques 1-3(0,3-9)

815 Lipids and Biomembranes 3(3,0)

817 Chemistry and Metabolism of Hormones 3(3,0)

819 Regulation of Intermediary Metabolism 3(3,0)

820 Nucleic Acids and Protein Biosynthesis 3(3,0)

821 Proteins 3(3,0)

822 Enzymes (3,0)

824 Cellular Regulations at the Molecular Level 3(3,0)

825 Neurochemistry 3(3,0)

831 Physical Biochemistry 3(3,0)

851 Biochemistry Seminar 1(1,0)

871 Advanced Topics 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

BIOENGINEERING (BIOE)

Professors: F. W. Cooke, R. L. Dooley, A. F. von Recum, *Head; Associate Professors:* D. D. Moyle, D. L. Powers; *Assistant Professors:* F. H. Bilge, W. R. Krause, E. M. O'Brien; *Visiting Assistant Professor:* R. A. Straup; *Adjunct Professors:* E. W. Berg, L. S. Bowman, T. N. Salthouse, F. A. Young, Jr

301 Engineering Aspects of Biology and Medicine 2(2,0) The relationships of various branches of engineering to biology and medicine. Structural engineering, fluid flow, and mass transfer in living systems. Artificial organs, biomaterials, implants, instrumentation, and other engineering challenges are discussed.

302 Biomaterials 3(3,0) Study of metallic, ceramic, and polymer materials used for surgical and dental implants. Materials selection, implant design, physical and mechanical testing. Corrosion and wear in the body. In addition, physical and mechanical properties of tissue as related to microstructure are studied. *Preq:* CRE 310 or consent of instructor.

303 Artificial Organs 3(3,0) Designed to provide engineering and biological and physical science students with an insight into the problems associated with replacing parts of the human body with artificial devices. Lectures will be supplemented with demonstrations and medical films.

320 Introduction to Structural Biomechanics 3(3,0) Introduction to the analysis of the mechanical function of the human body and the effect of external forces on the body. The study of the mechanics of the skeletal system is the main emphasis of the course. *Preq:* EM 201.

401, 601 Computers for Bioscientists 1(1,0) Analog and digital simulation of biochemical and biological processes. Systems approaches, dynamic analysis, interactions between laboratory research and computer models. *Preq:* One semester of calculus or consent of instructor.

402, 602 Medical Applications of Engineering 3(3,0) A survey of the applications of physical principles to health science. Topics included are production and detection of X-rays, diagnostic radiology and radiation therapy, nature of radioactive emissions, relative biological effectiveness, nuclear medicine, radiation protection, surgical uses of lasers, cryogenics, cryobiology and cryosurgery, ultrasound, electrosurgery. *Preq:* General chemistry.

415, 615 Dental Materials 2(2,0) An interdisciplinary course which reviews the biological and engineering aspects of dental materials. Topics: Properties and Structure of Materials (polymers, metals, alloys, ceramics, composites, degradation of materials in oral environment) and Applied Dental Materials (cement, amalgam, impression materials, gypsum compounds, waxes, gold and its alloys, base metal alloys, polymers applied in dentistry, recent advances in dental implant materials). *Preq:* CH 223 and PHYS 208.

450, 650 Special Topics in Biomedical Engineering 1-4(0-4,12-0) Comprehensive study of a topic of current interest in the field of biomedical engineering. May be taken for credit more than one time. *Preq:* Consent of instructor.

800 Seminar in Bioengineering 1(1,0)

801 Biomaterials 3(3,0)

802 Compatibility of Biomaterials 3(1,6)

803 Polymers as Biomaterials 3(3,0)

812 Orthopedic Pathology 3(3,0)

820 Structural Biomechanics 3(3,0)

823 Artificial Cardiac Assistance and Replacement 2(2,0)

847 Elements of Bioengineering 4(4,0)

850 Special Topics in Biomedical Engineering 1-4(0-4,12-0)

870 Bioinstrumentation 3(2,2)

882 Experimental Surgery 4(2,6)

890 Internship 1-5(0,8-40)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

BIOLOGICAL SCIENCE (BIOSC)

201 Plant Diversity 4(3,3) Survey of the major groups of plants, their structure, development, and reproduction. Evolutionary relationships as exemplified by comparisons of body organization and life cycles will be emphasized. *Preq:* BIOL 104/106 or 111 or BOT 205.

202 Animal Diversity 4(3,3) Survey of animal diversity with emphasis on structure, function, and evolution of the major taxa. Representative organisms will be observed and dissected in the laboratory. *Preq:* BIOL 111 or consent of instructor.

210 Biology of Culture and Religion 3(3,0) Drawing on findings from sociobiology, evolution, genetics and molecular biology, this course examines the biology of man's culture and religion. Topics include the coevolution of culture and gene systems, the adaptive significance of religion, evolution, free-will and the creative process, altruism, mysticism and states of consciousness. *Preq:* BIOL 103 and 104 or consent of instructor.

211 Tropical Biology 3(1,6) Fundamental approach to basic ecological and evolutionary principles in tropical ecosystems, concentrating primarily upon the rainforest and coral reef. *Preq:* BIOL 103 and 104 (or 110 and 111) or equivalent, or consent of instructor.

280 Industry and the Biologist 3(3,0) Course will introduce the student to biological principles applied by industry and the regulatory agencies concerning establishment of an industrial facility discharging effluent into a recreational river. *Preq:* One year of biology.

281 Industrial Biologist's Survey of Natural Resource Regulations 2(2,0) A survey of the laws and regulations protecting natural resources, emphasizing the historical perspectives and impacts on regulated communities by utilizing actual case studies. *Preq:* One year of biology or consent of instructor.

435, 635 Principles of Evolution 4(4,0) Introduction to the fundamental principles and major concepts of the evolutionary process in animals, including a consideration of evolutionary theories, adaptive processes in populations, and major evolutionary patterns and to the principles of classification and systematics. *Preq:* GEN 302 or consent of instructor.

441, 641 Ecology 4(3,3) Fundamental approach to basic ecological principles underlying the interrelationship of organisms with their biotic and abiotic environments. *Preq:* BIOL 104/106 or 111.

442, 642 Biogeography 3(3,0) Study of patterns of distribution of plants and animals in space and time. *Preq:* BIOSC 201 and 202 or consent of instructor.

443, 643 Aquatic Ecology 4(3,3) Study of basic ecological principles and concepts as they apply to aquatic environments: rivers and streams, lakes and ponds, reservoirs, swamps, marshes, estuaries, and marine systems. Laboratories will provide practical experience in techniques and methods used in the ecological analysis of the physical, chemical, and biological properties of aquatic systems. *Preq:* Junior standing in a life science.

452, 652 Anatomy and Morphology of Vascular Plants 4(3,3) Studies of the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Preq:* BIOL 104/106 or 111 or BOT 205 or consent of instructor.

461, 661 Cell Biology 4(3,3) Study of structure, function, and diversity of cells and cell biological technique, emphasizing biomembrane function, energy transduction, motility, cell cycle, secretion, and cellular digestion. Laboratory exercises will reinforce the principles presented in lecture and introduce several modern techniques used in cell biological research. *Preq:* BIOCH 301 or consent of instructor.

483, 683 Regulatory Biology I 4(3,3) Introduction to topics and techniques employed in the practice of regulatory biology, focusing on biological aspects of water, waste, and air problems. Actual litigations, plant sitings, and public documents will be used throughout the course. May be taken subsequent to BIOSC 484. *Preq:* One year of biology, one year of chemistry, one course in microbiology, or consent of instructor.

484, 684 Regulatory Biology II 4(3,3) The second course in a two-part series, introducing the student to the concerns of mutagenesis, teratogenesis, and carcinogenesis in an industrial setting with actual case problems studied. May be taken before BIOSC 483. *Preq:* One year of biology, one year of chemistry, a biochemistry course, or consent of instructor.

485, 685 Biological Assessment of Aquatic Environments 4(3,3) Course that teaches the theory and application of protocols using living organisms in monitoring biological effects of pollutants on aquatic systems. Fieldwork, laboratory, and contemporary case studies are emphasized. *Preq:* One year of introductory biology, one year of chemistry, an animal diversity course, or consent of instructor.

BIOLOGY (BIOL)

Professors: D. R. Helms, *Director;* W. H. Leonard; *Associate Professors:* R. A. Garcia, W. M. Surver, C. K. Wagner; *Assistant Professors:* J. L. Dickey, R. J. Kosinski, M. V. Ruppert, D. J. Stroup; *Instructors:* S. Aneja, A. D. Smith; *Lecturer:* J. G. Schaadt

103 General Biology I 3(3,0)[1] The first course in a two-semester sequence on the fundamentals of biology. Emphasizes the structural, molecular, and energetic basis of cellular activities, fundamentals of genetic variability, and reproductive strategies of organisms. Diversity of animals and principles of evolution are introduced.

104 General Biology II 3(3,0)[1] Continuation of BIOL 103, emphasizing animals and plants as functional units, the evolution and diversity of plants, and the principles of evolution and ecology. *Preq:* BIOL 103.

105 General Biology Laboratory I 1(0,3)[1] Laboratory course that illustrates through experimentation, and/or demonstration the structure and activities of cells, genetics, and diversity of animals. This course is strongly recommended for students taking BIOL 103. *Coreq:* BIOL 103 or consent of instructor.

106 General Biology Laboratory II 1(0,3)[1] Laboratory course that illustrates through experimentation and/or demonstration the diversity of microbes, fungi, and plants. The structure and function of animals and plants, and the study of evolution and ecology are also emphasized. The course is strongly recommended for students taking BIOL 104. *Coreq:* BIOL 104 or consent of instructor.

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[1] Credit toward a degree will be given for only one combination of the following: BIOL 110 or 103/105 followed by BIOL 111 or 104/106 or BOT 205, dependent on the requirements for the major.

110 Principles of Biology I 5(4,3)[1] An introductory course designed for students majoring in biological disciplines of the College of Sciences. The course integrates lecture and laboratory and emphasizes a modern, quantitative, and experimental approach to explanations of structure, composition, dynamics, interactions, and evolution of cells and organisms. High school chemistry is recommended. *Coreq:* CH 101

111 Principles of Biology II 5(4,3)[1] Continuation of BIOL 110 that emphasizes the study of plants and animals as functional organisms and the principles of ecology. *Preq:* BIOL 110

700 Classical Genetics 1

701 Microcomputer in the Biology Curriculum I 1

702 Ecology 1

703 Survey of the Kingdoms Monera, Protista, and Fungi 1

704 Analytical Thinking in Biology 1

705 Public Health Microbiology 1

706 Basic Methods of Preserving Vertebrates for Teaching Collections 1

707 Preparation of Plants for Permanent Teaching Collections 1

708 Food Microbiology 1

709 Biological Microscopy and Microtechnique 1

710 Special Institute Course: Selected Topics in Biology 1-6(0-6,0-18)

731 Microcomputer in the Biology Curriculum II 1

732 Microecosystems in the Classroom 1

733 The Brain, Nervous System, and Sense Organs 1

734 The Physiology of Respiration 1

761 Microcomputer in the Biology Curriculum III 1

762 Human Genetics 1

763 Fundamental Immunology and Serology in Public Health 1

764 Modern Molecular Genetics 1

BOTANY (BOT)

Professors: N. D. Camper, C. R. Dillon, J. E. Fairey III; *Associate Professors:* R. E. Ballard, L. A. Dyck, T. M. McInnis, Jr., K. M. Peterson; *Visiting Professor:* J. B. Whitney

145 Environmental Dynamics 2(2,0) Nontechnical ecology course designed to aid in understanding the natural world and how it operates. Taught in the jargon of the mass media, it is designed for nonbiologists though biology students may find that it helps in assimilation of the major ecological concepts.

146 Environmental Dynamics Practicum 1(0,3) Course designed to give first-hand experience, either through analysis or observation, of the topics covered in BOT 145. *Coreq:* BOT 145

201 Field Botany 3(2,3) Introductory study of the taxonomy, ecology, and evolutionary processes of plants native to South Carolina. Emphasis is on field work which requires visits to many different habitats for observation and study of plant diversity. *Preq:* BIOL 104/106 or 111 or BOT 205

203 Humanistic Botany 2(2,0) Nontechnical course emphasizing plant species that have had an impact on human cultural development: history, economics, religion, comfort, and pleasure. *Preq:* BIOL 104/106 or 111 or BOT 205

205 Plant Form and Function 4(3,3) Introductory course designed for students majoring in plant sciences of the College of Agricultural Sciences and the College of Forest and Recreation Resources. The course integrates lecture and laboratory and emphasizes fundamental structures and functions of higher plants. *Preq:* BIOL 103, 105, or consent of instructor

221 Medical Botany 2(2,0)S Nontechnical course dealing with plant-originated drugs and substances used in modern treatment of physical and mental maladies of man will be studied along with plant products historically associated with folk medicine Plants producing substances which are remedial, psychoactive, poisonous, carcinogenic, antibiotic, hallucinogenic, and others are included in this study. *Preq:* BIOL 104/106 or 111 or BOT 205.

411, 611 Introductory Mycology 4(3,3) Introduction to the biology of all the groups of fungi and some related organisms, with considerations of the taxonomy, morphology, development, physiology and ecology of representative forms. Laboratory includes collection, identification and culture of native fungi. *Preq:* BIOL 104/106 or 111 or BOT 205.

413, 613 Phycology 4(3,3) Introduction to the biology of algae Consideration is given to the structure, classification, evolution, natural history, physiology, and ecology of all algal groups. Laboratory includes experimentation, collection and identification of both freshwater and marine algae, and a field trip to the Florida Keys over the spring break *Preq:* BIOL 104/106 or 111 or BOT 205.

421, H421, 621 Plant Physiology 4(3,3) The relations and processes which have to do with the maintenance, growth and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. *Preq:* CH 101, 102, PHYS 207 or 221 and 223.

431, H431, 631 Introductory Plant Taxonomy 4(3,3) Introduction to the basic principles and concepts of plant systematics with laboratory and field emphasis on the flora of South Carolina. *Preq:* BIOL 104/106 or 111 or BOT 205.

435, 635 Evolution of Plant Species 3(3,0) Examination of species concepts and factors affecting the formation of species. *Preq:* BOT 431, GEN 302, or consent of instructor

456, 656 Plant Microtechnique 2(0,6) Application of the principles of microtechnique involved in the fixing, cutting, and staining of plant tissues. *Preq:* Consent of instructor.

491 Special Problems in Botany 2-4(0,6-12) Research problems in selected areas of botany to provide an introduction to research planning and techniques for Botany majors. *Preq:* Senior standing and consent of the department head.

H492 Special Problems in Botany 1(0,3) Continuation of BOT 491. Research results from BOT 491 are written in a style appropriate for publication and presented in an open seminar. *Preq:* BOT 491.

701 Evolutionary Botany for Teachers 3(2,3)

702 Modern Botanical Concepts for Teachers 3(3,0)

805 Special Problems in Botany. Credit to be arranged.

807 Seminar 1(1,0)

813 Special Topics in Mycology 2-4(0-2,0-6)

815 Phycology Colloquium 1-3(1-3,0)

821 Inorganic Plant Metabolism 4(3,3)

822 Organic Plant Metabolism 3(3,0)

823 Plant Growth and Development 3(3,0)

824 Mode of Action of Growth Substances 4(3,3)

831 Advanced Plant Taxonomy 4(3,3)

832 Special Topics in Plant Systematics 1-4(1-3,0-3)

837 Evolution of Angiosperms 3(3,0)

841 Biology of Aquatic Vascular Plants 3(2,3)

842 Physiological Plant Ecology 3(3,0)

843 Physiological Plant Ecology Laboratory 1(0,3)

845 Special Topics in Plant Ecology 1-4(1-3,0-3)

846 Plant Ecology 4(3,3)

850 Plant Tissue and Cell Culture 3(2,3)

851 Plant Anatomy 3(2,3)

861 Plant Cell Biology 3(3,0)

891 Master's Research. Credit to be arranged.

921 (HORT) Plant Physiology Colloquium 1(1,0)

991 Doctoral Research. Credit to be arranged.

CERAMIC ARTS (CRAR)

Professor: G. C. Robinson; *Associate Professor:* H. G. Lefort

101 Pottery Materials 3(2,3) Occurrence and properties of pottery raw materials. Attention is devoted to the occurrence of natural pottery materials in South Carolina and the methods and equipment used in preparing these materials.

102 Pottery Drying and Firing 3(3,0) The drying and firing process used in pottery making. A discussion is included on the design and construction of simple pottery kilns, and the student is required to build and operate a small outdoor kiln. The laboratory work demonstrates the drying and firing behavior of pottery

CERAMIC ENGINEERING (CRE)

Professors: C. C. Fain, G. Lewis, *Head;* G. C. Robinson; *Associate Professors:* H. G. Lefort, T. D. Taylor; *Assistant Professors:* B. I. Lee, H. D. Leigh III, E. C. Skaar

201 Introduction to Ceramic Engineering 2(2,0) Introduction to ceramic engineering together with a study of ceramic forming operations. Exercises are provided in the analysis of processing problems, the evaluation of background information and the creation of new solutions to processing problems.

202 Ceramic Materials 3(3,0) Properties and uses of commonly used ceramic materials. Equilibrium diagrams are used to gain an understanding of the effect of heat on the materials.

204 Laboratory Procedures 1(0,3) Introduction to ceramic laboratory procedures. Primary consideration will be given to the evaluation of sources of error and significance of measurement in the major ceramic test procedures.

302 Thermo-Chemical Ceramics 3(3,0) High-temperature equilibrium using the laws of physical chemistry as applied to ceramic systems in both solid and liquid states. An introduction to the crystal chemistry of ceramic raw materials, and the effect of crystalline form on their high-temperature behavior.

303 Materials Technology in Product Selection by Consumers 2(2,0) Intended to convey to the consumer a sufficient understanding of the properties of materials—metals, plastics, and ceramics—to enable the customer to make intelligent buying decisions. Property characteristics are related to cost and performance. Specific cases involving decisions are used to illustrate fundamental principles. Simple tests to determine material properties are suggested for consumer use.

304 Experiment Design 2(0,6) Exercise in the planning and organization of experiments in the ceramic field.

306 Fuels Combustion and Heat Transfer 1(0,3) Combustion devices, the calculation of combustion problems and heat transfer

307 Thermal Processing of Ceramics 3(3,0) The accomplishment of changes in structure and composition through the application of thermal energy. The course includes a study of simultaneous transfer of heat and mass, fluid flow, determinants of rates in a variety of reactions and calculations of the energy requirements to accomplish change in structure or composition

309 Research Methods 2(0,6) The planning and solution of selected research problems

310 Introduction to Material Science 3(3,0) A beginning course in material science designed primarily for engineering students. The course is a study of the relation between the electrical, mechanical and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms.

311 Kinetics of Materials Processes 3(3,0) Study of the kinetics of solid-solid, solid-liquid and solid-gaseous reaction as they apply to materials system, energy transport as applied to materials processing, and the importance of these phenomena to manufacturing and design of materials. *Preq:* CH 331.

402, 602 Solid State Ceramics 3(3,0) The effects of the composition, form, and shape of ceramic raw materials on the manufacturing processes and final properties of ceramic products. Included are fundamental studies of such phenomena as deflocculation, plasticity, sintering and the behavior of ceramic products in electrical circuits. *Preq:* Junior standing.

403, 603 Glasses 3(3,0) Glass structure and composition and their relation to the properties of glasses. Consideration is given to the processing variables which control the properties of glasses including glass products, enamels, glazes, and vitreous bonds.

404, 604 Ceramic Coatings 3(3,0) The raw materials, methods of manufacture, and properties of ceramic coatings. *Preq:* CRE 302.

406 Ceramic Project 2(0,6) The completion of an original research into a ceramic problem. *Preq:* CRE 302.

407 Plant Design 3(1,6) The application of the fundamentals of ceramic engineering to problems in plant design. *Preq:* Senior standing in Ceramic Engineering.

410, 610 Analytical Processes 3(2,3) Introductory course on the theory and use of X-ray diffraction and spectroscopic methods. *Preq:* Junior standing.

412, 612 Raw Material Preparation 3(3,0) Equipment and processes used in the crushing and grinding of raw materials, the separation and classification of particle sizes, and the separation and purification of minerals by mineral dressing methods.

416, 616 Electronic Ceramics 3(3,0) Theory and measurement of the electronic properties of ceramic products.

418, 618 Process Control 3(3,0) Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. The application of laboratory techniques to the control of product quality and process efficiency is included. *Preq:* Junior standing.

419, H419, 619 Science of Engineering Materials 3(3,0) Course planned to acquaint engineers with the thermal, electrical, and chemical characteristics of engineering materials. It emphasizes fundamental consideration of the structure of matter in the solid and glassy states, solid state reactions, and the influence of particle and aggregate structure to speed of reaction and product properties. The reasons for the properties of materials at elevated temperatures and room temperatures are related to these fundamentals.

420, 620 Science of Engineering Materials 3(3,0) Continuation of CRE 419 with emphasis on application of fundamentals in nuclear reactors and nuclear power plants. Consideration is given to the development of ceramics for fuel elements, moderator materials, control rods, shielding and radioactive waste disposal.

425, 625 Specialized Processing of Ceramic Materials 3(2,2) Processing of ceramic materials under conditions such as ultra high vacuum or gravity-free conditions. Emphasis will be placed on adapting one selected ceramic process to a set of special conditions selected by the instructor. *Preq:* Junior standing in engineering or consent of instructor.

490, H490, 690 Special Topics in Ceramic Engineering 1-3(1-3,0) Study of topics not ordinarily covered by other courses. Taught as the need arises. Typical topics could include current research in a specific area of technological advances. Course may be repeated up to a limit of 6 credits. *Preq:* Consent of instructor.

701 Special Problems 3(1-3,0)

807 Specialized Ceramics 3(3,0)

809 High-Temperature Materials 3(3,0)

814 Ceramic Physical Processing 3(3,0)

815 Colloidal and Surface Science 3(3,0)

816 Constitution and Structure of Glasses 3(3,0)

821 Analytical Procedures and Equipment I 3(2,3)

822 Analytical Procedures and Equipment II 3(2,3)

824 Mechanical Properties of Ceramic Materials 3(3,0)

825 Magnetic and Electrical Ceramic Material 3(3,0)

826 Ceramic Coatings 3(3,0)

828 Solid State Ceramic Science 3(3,0)

832 Ceramic Reaction Thermodynamics 3(3,0)

891 Master's Research. Credit to be arranged.

CHEMICAL ENGINEERING (CHE)

Professors: F. C. Alley, W. B. Barlage, Jr., J. N. Beard, Jr., W. F. Beckwith, D. D. Edie, J. M. Haile, S. S. Melsheimer, *Acting Head;* J. C. Mullins; *Associate Professors:* C. H. Gooding, R. W. Rice; *Assistant Professors:* A. A. Ogale, M. C. Thies; *Lecturer:* G. B. Pullen

201 Introduction to Chemical Engineering 3(2,2) Introduction to the concepts of chemical engineering and a study of PVT relations for gases and vapors, material and energy balances, equilibria in chemical systems, and combined material and energy balances. *Preq:* CH 112, ENGR 180.

220, H220 Chemical Engineering Thermodynamics I 3(3,0) A first basic course in static equilibria. Topics include the first and second laws of thermodynamics, real and ideal gases, thermodynamic properties of fluids, phase changes, and heats of reaction. *Preq.* CHE 201 and MTHSC 206.

301 Unit Operations Theory I 3(3,0) The general principles of chemical engineering and a study of the following unit operations: Fluid Flow, Fluid Transportation, Heat Transmission and Evaporation. Special emphasis is placed on theory and its practical application to design. *Preq:* CHE 201, MTHSC 206.

302 Unit Operations Theory II 3(3,0) Study of selected unit operations based on diffusional phenomena Primary attention will be given to differential contact operations such as absorption, humidification, and gas-liquid contact *Preq:* CHE 301, 352.

306 Unit Operations Laboratory I 2(1,3) Laboratory work in the unit operations of fluid flow, heat transfer and evaporation. Stress is laid on the relation between theory and experimental results and on report writing. *Preq:* CHE 301.

321 Chemical Engineering Thermodynamics II 3(3,0) Continuation of CHE 220. Subjects include heat engines, compressors, refrigeration, phase equilibria, and chemical reaction equilibria. *Preq:* CHE 220, 352 and CH 331.

352, H352 Process Modeling and Numerical Methods 3(3,0) This course will introduce students to some basic concepts of chemical process modeling and the use of numerical methods of solution of typical chemical engineering problems. Digital computational techniques for the numerical methods will use a specific procedure-oriented language such as Fortran. *Preq:* CHE 201 and MTHSC 208.

353, H353, 653 Process Dynamics 3(3,0) Basic process control and the effect of feedback in various systems The mathematical analysis of the dynamic response of process systems to step and sinusoidal changes Determination of the optimum settings for various combinations of proportional, reset and derivative control. *Preq:* CHE 301, 352 or equivalent, and MTHSC 208.

401, H401, 601 Transport Phenomena 3(3,0) Mathematical analysis of single and multi-dimensional steady-state and transient problems in momentum, energy, and mass transfer Both the similarities and differences in these mechanisms are stressed *Preq:* CHE 302 and MTHSC 208

403, H403 Unit Operations Theory III 3(3,0) Study of unit operations not covered in CHE 301 and 302 Includes liquid-liquid extraction, distillation, and other unit operations. *Preq:* CHE 302, 321 and CH 332

407 Unit Operations Laboratory II 3(1,6) Continuation of CHE 306 with experiments primarily on the diffusional operations. Additional lecture material on report writing and general techniques for experimental measurements and analysis of data. *Preq:* CHE 302, 306, 353.

412, 612 Polymer Engineering 3(3,0) Design-oriented course in synthetic polymers. Topics include reactor designs used in polymer production, effect of step versus addition kinetics on reactor design, epoxy curing reactions, polymer solubility, influence of polymerization, and processing conditions on polymer crystallinity *Preq:* CH 224 and 332 or consent of instructor.

415, 615 Introduction to Nuclear Engineering 3(3,0) Designed to acquaint the nonnuclear engineer with some of the engineering aspects of nuclear science Topics include a brief survey of particle physics; nuclear reactions; energy transformations, nuclear reactors, their design, construction and use; radiation damage to materials of construction, and special problems in nuclear engineering peculiar to the basic engineering disciplines *Preq:* Junior or Senior standing in engineering, chemistry, or physics.

421 Process Development, Design, and Optimization of Chemical Engineering Systems I 3(2,3) Study of the steps in creating a chemical process design from the original concept to successful completion and operation of the plant. Topics include engineering economics, systems analysis, simulation, optimization, process equipment sizing and selection, and the application of analog and digital computers. *Preq:* CHE 302.

422 Process Development, Design, and Optimization of Chemical Engineering Systems II 3(0,9) Continuation of CHE 421. The principles of process development, design, and optimization are applied in a comprehensive problem carried from a general statement of the problem to detailed design and economic evaluations. *Preq:* CHE 321, 353, 403, 421 and 450 or consent of department head.

424, 624 Introduction to Industrial Pollution 3(3,0) Introduction to air and water pollution problems associated with chemical processing, transportation and power generation. Basic processes and mechanisms utilized in the control of liquid and gaseous wastes are discussed from a standpoint of equipment design and economics. Present and future trends in pollution legislation are reviewed. *Preq:* Senior standing or consent of instructor.

426 Pulp and Paper Engineering 3(3,0) Study of the unit processes and of the design of the processing equipment used in the pulp and paper industry. *Preq:* CH 102 or 112

428, 628 Biochemical Engineering 3(3,0) Use of microorganisms and enzymes for the production of chemical feedstocks, single-cell protein, antibiotics, and other fermentation products. Topics include kinetics and energetics of microbial metabolism, design and analysis of reactors for microbial growth and enzyme-catalyzed reactions, and considerations of scale-up, mass transfer, and sterilization during reactor design. *Preq:* CHE 302 and 450 or consent of instructor.

440 Chemical Engineering Senior Seminar I 0(1,0) Topics covered include oral communication, job interviewing skills, professionalism and professional ethics, and chemical engineering job functions in various industries. Oral presentations are given by students, and invited speakers from the profession will discuss issues of current interests. To be taken Pass/Fail only. *Preq:* CHE 302. *Coreq:* CHE 421.

441 Chemical Engineering Senior Seminar II 0(1,0) Continuation of CHE 440. To be taken Pass/Fail only. *Preq:* CHE 440. *Coreq:* CHE 442.

450, H450, 650 Chemical Engineering Kinetics 3(3,0) Introduction to the kinetics of chemical reactions. Topics include homogeneous and heterogeneous reactions, batch and flow reaction systems, catalysis, and design of industrial reactors. *Preq:* CHE 301, 321, MTHSC 208 and CH 332.

454, 654 Computer Process Control 3(3,0) Introduction to digital computer control as applied in the chemical process industries. Topics include dynamics of process systems, control computer hardware and software, sampled data mathematics, digital control algorithms, process identification, and advanced control techniques. *Preq:* CHE 353 or equivalent and E&CE 307, MTHSC 208.

491, H491 Special Projects in Chemical Engineering 1-3(1-3,0) As a need arises, special topics requested by students or offered by the faculty will be taught. Review of current research in an area, technological advances and national engineering goals are possible topic areas.

802 Process Dynamics and Control 3(3,0)

803 Advanced Transport Phenomena 3(3,0)

804 Chemical Engineering Thermodynamics 3(3,0)

805 Chemical Engineering Kinetics 3(3,0)

813 Chemical Engineering Finite Element Analysis 3(3,0)

814 Applied Numerical Methods in Process Simulation 3(3,0)

815 Polymer Engineering Laboratory 3(2,3)

818 Polymer Processing 3(3,0)

821 Heat Transport 3(3,0)

822 Mass Transfer and Differential Contact Operation 3(3,0)

823 Mass Transfer and Stagewise Contact Operation 3(3,0)

834 Advanced Chemical Engineering Thermodynamics 3(3,0)

845 Selected Topics in Chemical Engineering 3(3,0)

846 Selected Topics in Chemical Engineering 3(3,0)

890 Special Projects 1-6(1-6,0)

891 Master's Research. Credit to be arranged.

895 Chemical Engineering Graduate Seminar 0(1,0)

945 Selected Topics in Chemical Engineering 3(3,0)

946 Selected Topics in Chemical Engineering 3(3,0)

991 Doctoral Research. Credit to be arranged.

CHEMISTRY (CH)

Professors: R. A. Abramovitch, J. F. Allen, A. L. Beyerlein, M. B. Bishop, D. D. DesMarteau, *Head;* J. C. Fanning, J. W. Huffman, N. P. Marullo, J. D. Petersen, A. R. Pinder, G. B. Savitsky, H. G. Spencer, J. L. von Rosenberg, Jr.; *Associate Professors:* C. B. Bishop, R. C. Dieter, K. Dill, J. F. Geldard, T. G. Tisue; *Assistant Professors:* A. L. Kholodenko, J. W. Kolis, R. K. Marcus, G. H. Robinson, S. R. Spurlin; *Lecturer:* D. J. Hunt; *Visiting Professor:* J. D. Spain; *Visiting Assistant Professor:* J. W. Dieter; *Visiting Instructors:* M. M. Cooper, S. Zuberi

101 General Chemistry 4(3,3) Students are introduced to the elementary concepts of chemistry through classroom and laboratory experience. The course emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure.

102, H102 General Chemistry 4(3,3)[1] Continuation of CH 101, treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. For students taking one year of chemistry or continuing in CH 201.

112 General Chemistry 4(3,3)[1] Continuation of CH 101 which emphasizes solutions, thermodynamic concepts, kinetics and oxidation-reduction reactions. The laboratory emphasizes solution chemistry and qualitative analyses. Recommended for students continuing in CH 223.

141 Chemistry Orientation 1(1,0) Lectures, discussions, and demonstrations devoted to health and safety in the chemistry laboratories, use of the chemical literature; and career planning. *Preq:* Registration in CH 101.

201 Survey of Organic Chemistry 4(3,3)[2] Introduction to organic chemistry emphasizing nomenclature, classes of organic compounds, chemistry of functional groups. For students needing a one-semester course in organic chemistry. *Preq:* CH 102 or consent of instructor.

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[1] Credit toward a degree will be given for only one of the following: CH 102 or 112.
[2] Credit toward a degree will be given for only one of the following: CH 201 or 223.

205 Introduction to Inorganic Chemistry 2(2,0) One semester treatment which emphasizes the properties and reactions of the more common chemical elements. *Preq:* Registration in Ch 112.

223 Organic Chemistry 3(3,0)[2] Introductory course covering the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. *Preq:* CH 112 or consent of instructor.

224 Organic Chemistry 3(3,0) Continuation of CH 223. *Preq:* CH 223.

225 Organic Chemistry Laboratory 2(0,6)[3] The laboratory techniques involved in the synthesis, separation and purification, and characterization of typical examples of the classes of organic compounds. *Preq:* Registration in CH 223.

226 Organic Chemistry Laboratory 2(0,6)[4] Continuation of CH 225. *Preq:* Registration in CH 224.

227 Organic Chemistry Laboratory 1(0,3)[3] The synthesis and properties of typical examples of the classes of organic compounds. *Preq:* Registration in CH 223

228 Organic Chemistry Laboratory 1(0,3)[4] Continuation of CH 227. *Preq:* CH 227 and registration in CH 224.

229 Organic Chemistry Laboratory 1(0,3)[3] A one-semester laboratory for chemical engineering students. *Preq:* CH 223.

313 Quantitative Analysis 3(3,0) The fundamental principles of volumetric, gravimetric and certain elementary instrumental chemical analyses. *Preq:* Registration in CH 315 or 317

315 Quantitative Analysis Laboratory 2(0,6)[5] The laboratory techniques of volumetric, gravimetric, and elementary instrumental analysis. *Preq:* Registration in CH 313.

317 Quantitative Analysis Laboratory 1(0,3)[5] The standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental. *Preq:* Registration in CH 313.

330 Introduction to Physical Chemistry 3(3,0)[6] A one-semester treatment of physical chemistry which emphasizes topics that are especially useful in the life sciences, agriculture and medicine: chemical thermodynamics, equilibrium, solutions, kinetics, electrochemistry, macromolecules, and surface phenomena. *Preq:* One semester of calculus.

331, 631 Physical Chemistry 3(3,0)[6] Includes the gaseous state, thermodynamics, chemical equilibria, and atomic and molecular structure, from both experimental and theoretical points of view. *Preq:* MTHSC 206, physics.

332, H332, 632 Physical Chemistry 3(3,0) Continuation of CH 331, including chemical kinetics, liquid and solid state, phase equilibria, solutions, electrochemistry and surfaces.

339, 639 Physical Chemistry Laboratory 1(0,3) Experiments are selected to be of maximum value to Chemistry and Chemical Engineering majors. *Preq:* Registration in CH 331.

340, 640 Physical Chemistry Laboratory 1(0,3) Continuation of CH 339. *Preq:* Registration in CH 332.

402, H402, 602 Inorganic Chemistry 3(3,0) Basic principles of inorganic chemistry are discussed with special emphasis on atomic structure, chemical bonding, solid state, coordination chemistry, organometallic chemistry and acid-base theories. The chemistry of certain selected elements is treated. *Preq:* CH 331, 332.

411, 611 Instrumental Analysis 4(2,6) Demonstration and operation of modern optical and electronic precision-measuring devices as they apply to the processes of analytical, physical and organic chemistry. *Preq:* Physical chemistry.

413 Chemistry of Aqueous Systems 3(3,0) Chemical equilibria in aqueous systems, especially natural waters; acids and bases, dissolved CO_2, precipitation and dissolution, oxidation-reduction, adsorption, etc. May be elected instead of CH 313 with consent of instructor. *Preq:* CH 223, 224.

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[3] Credit toward a degree will be given for only one of the following: CH 225, 227, or 229.

[4] Credit toward a degree will be given for only one of the following: CH 226 or 228.

[5] Credit toward a degree will be given for only one of the following: CH 315 or 317.

[6] Credit toward a degree will be given for only one of the following: CH 330 or 331.

421, H421, 621 Advanced Organic Chemistry 3(3,0) Survey of modern organic chemistry with an emphasis on synthesis and mechanisms. *Preq:* CH 224, 332, or equivalent

427, 627 Organic Spectroscopy 3(2,3) Survey of modern spectroscopic techniques used in the determination of molecular structure Emphasis is on the interpretation of spectra nuclear magnetic resonance, ultraviolet, infrared, mass spectroscopy, optical rotatory dispersion and circular dichroism. *Preq:* One year each of organic chemistry and physical chemistry

435, H435, 635 Spectroscopy and Molecular Structure 3(3,0) Molecular spectroscopy and structure as elucidated by elementary quantum mechanics Topics covered include Planck's black-body radiation formulation leading to the quantum concept, solution of Schroedinger's equation for single systems, microwave spectroscopy, infrared and Raman spectroscopy, Fourier transformed spectra, electronic spectra and structure, and elementary statistical thermodynamics *Preq:* CH 331, 332, MTHSC 208.

441 Glass Manipulation 2(0,6) A course designed to teach the fundamentals of glass manipulation and its application to the construction and repair of simple laboratory apparatus.

443 Research Problems 3(0,9) Original investigation of an assigned problem in a fundamental branch of chemistry This work must be carried out under the supervision of a member of the staff *Preq:* Senior standing in Chemistry or consent of instructor

444 Research Problems 3(0,9) Continuation of CH 443.

454, H454, 654 Chemical Synthesis 3(1,6) Designed to introduce the student to modern research techniques in inorganic and organic chemistry The experiments to be carried out involve the synthesis of various types of compounds by diverse experimental techniques. Modern instrumental methods will be used to characterize the products. *Preq:* Organic chemistry

491, H491, 691 Introduction to Radiochemistry 3(2,3) Study of natural and synthetic isotopes, including atomic and nuclear structures, properties of radiation, tracer techniques and applications. The laboratory includes methods of detection and measurement of radiation, and applications of tracer techniques. *Preq:* Senior or graduate standing, consent of instructor

700 Physical Science in Elementary School—Chemistry 3(2,3)

701 Review of General Chemistry 3(3,0)

702 Chemistry for High School Teachers 3(2,3)

703 Special Problems in Chemistry for Elementary and Secondary School Teachers 3-6(2-6,6-0)

804 Fundamental Principles of Inorganic Chemistry 3(3,0)

805 Theoretical Inorganic Chemistry 3(3,0)

806 Physical Methods in Inorganic Chemistry 3(3,0)

807 Chemistry of the Transition Elements 3(3,0)

808 Chemistry of the Nonmetallic Elements 3(3,0)

811 Analytical Chemistry 3(3,0)

812 Chemical Spectroscopic Methods 3(2,3)

814 Electroanalytical Chemistry 3(2,3)

816 Separation Science 3(3,0)

821 Organic Chemistry I 3(3,0)

822 Organic Chemistry II 3(3,0)

824 Fundamental Principles of Polymer Chemistry 3(3,0)

825 Chemistry of Heterocyclic Compounds 3(3,0)

830 Fundamentals of Physical Chemistry 3(3,0)

831 Chemical Thermodynamics 3(3,0)

834 Statistical Thermodynamics 3(3,0)

835 Chemical Kinetics 3(3,0)

837 Quantum Chemistry 3(3,0)

840 Techniques of Experimental Chemistry 3(1,6)

851 Seminar 0-2

861 Principles of Biochemistry 3(3,0)

891 Master's Research. Credit to be arranged.

900 Advanced Topics in Inorganic Chemistry 1-4(1-4,0)

910 Special Topics in Analytical Chemistry 1-4(1-4,0)

920 Advanced Topics in Organic Chemistry 1-4(1-4,0)

930 Advanced Topics in Physical Chemistry 1-4(1-4,0)

991 Doctoral Research. Credit to be arranged.

CIVIL ENGINEERING (CE)

Professors: S. C. Anand, R. H. Brown, *Head;* J. E. Clark, R. E. Elling, W. B. Ledbetter, J. C. McCormac, A. E. Schwartz, B. L. Sill, P. B. Zielinski; *Associate Professors:* W. Baron, J. L. Burati, C. H. Juang, R. F. Nowack, P. R. Sparks, D. B. Stafford; *Assistant Professors:* N. M. Aziz, A. Fiuzat, E. J. Hayter; *Adjunct Associate Professors:* C. Lindbergh, H. C. Saxe; *Adjunct Assistant Professors:* C. J. Coe, M. H. Woo

201 Surveying 3(2,3) Elementary plane surveying for civil engineering and other students whose curriculum requires a basic knowledge of surveying. Coverage includes measurement of distance, angles and elevations, stadia, topography, area and volume calculations, construction surveying. Field exercises provide practice in the use of surveying instruments. *Preq:* MTHSC 106.

205 Civil Engineering Computer Applications 3(3,0) Advanced FORTRAN programming for practical problems in civil engineering and micro-computer word processing, spreadsheets, and CAD packages. *Preq:* ENGR 180.

301, H301 Structural Analysis 3(3,0) Analysis of statically determinate structural elements and systems. Influence lines for beams and trusses. Calculation of rotations and deflections by moment area, conjugate beam and unit load methods. Moment distribution and introduction to other methods of indeterminate analysis. Use of microcomputers for the analysis of trusses, continuous beams, and frames. *Preq:* CE 205, EM 304.

302 Structural Steel Design 3(3,0) Design of steel tension members, beams, columns, beam-columns and connections by working stress method. Introduction to plastic analysis and design. Emphasis on AISC specification. *Preq:* CE 301.

310 Transportation Engineering 4(3,2) Planning, location, design, operation, and administration of highways, railroads, airports and other transportation facilities, including economic considerations, pavement design, and digital computer applications to geometric and earthwork computation. *Preq:* CE 201.

320 Introduction to Construction Materials 3(2,3) Basic properties of portland cement and bituminous asphalt. Classification of aggregates on the basis of strength and size distribution. Mix design procedures, field control, and adjustments. Properties of fresh mixes and hardened concrete. Behavior of other construction materials including metals, composites, and plastics. Field trips to nearby plants. *Preq:* EM 305.

324 Introduction to Construction Engineering 3(3,0) Survey of the principal methods and equipment used in the construction industry. Critical path methods, construction equipment, and construction management practices are included. *Preq:* Junior standing.

330 Soil Mechanics 4(3,3) Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength consolidation, stress distribution and failure analysis of soils. *Preq:* EM 304 and Junior standing.

402 Reinforced Concrete Design 3(3,0) Analysis and design of reinforced concrete beams, columns, footings, and one-way slabs using the strength design method Includes a brief introduction to the analysis and design of beams with the working stress method *Preq:* CE 301

403, 603 Use of Computers in Structural Analysis and Design 3(3,0) Analysis and design of statically determinate and indeterminate structural systems through the use of computers. Emphasis is placed on use of available computer programs likely to be used in industry. *Preq:* CE 301

404, 604 Masonry Structural Design 3(3,0) Fundamentals of masonry materials, construction, structural systems. Application of structural design principles to multistory structures. Lateral load resisting shear walls, loadbearing walls, columns and pilasters, connections. *Preq:* CE 402

405, 605 Structural Systems Design 3(3,0) Study of physical properties and mechanical response of engineered structural systems. Analytical and approximate methods of structural analysis are used to generate comparative structural performance data. *Preq:* CE 302. *Coreq:* CE 402 or consent of instructor.

410, 610 Traffic Engineering: Operations 3(3,0) Basic characteristics of motor-vehicle traffic; highway capacity applications of traffic control devices; traffic design of parking facilities; engineering studies, traffic safety; traffic laws and ordinances; public relations. *Preq:* CE 310.

412, 612 Urban Transportation Planning 3(3,0)F Urban travel characteristics; characteristics of transportation systems; transportation and land-use studies; trip distribution and trip assignment models; city patterns and subdivision layout. *Preq:* CE 310.

417, 617 Airphoto Interpretation I 3(2,3) A brief review of the basic geometry of aerial photographs, characteristics of geologic and topographic features identifiable from aerial photographs, and site characteristics related to soil profile. Laboratory work includes soil mapping, selection of construction sites, and location of soil deposits for engineering purposes. *Preq:* Junior standing.

419, 619 General Photogrammetry 3(2,3)S Fundamentals of mapping using aerial photographs; characteristics, production and use of aerial photographs; study of the operation of popular photogrammetric instruments including aerial cameras, stereoscopic viewing and plotting equipment; use of stereocomparagraph and multiplex plotting instruments; scale, tilt, and coordinate calculations; construction of photomosaics. *Preq:* Junior standing.

422, 622 Hydraulics and Hydrology 3(3,0) Concepts of open channel flow; flow measurement; hydraulic structures; hydraulic machinery, reservoirs and reservoir capacities; hydraulic transients; unsteady flow; study of precipitation; runoff; hydrograph analysis; flood routing. *Preq:* CE 205, EM 320.

423, 623 Applied Hydrology 3(2,3) Introduction to the elements of occurrence of water; hydrologic cycle, rainfall runoff relations, evaporation, transpiration, streamflow; probability concepts in hydrology; flood routing; stormwater detention and conveyance systems; groundwater flow. Emphasis will be on application and design. The laboratory will include design of components of storm drainage or other water conveyance facilities. *Preq:* EM 320.

425 Engineering Relations 3(3,0) Business, legal, and ethical relations in engineering practice. *Preq:* Senior standing.

431, 631 Applied Soil Mechanics 3(2,2) Relationship of local geology to soil formations, groundwater, planning of site investigation, sampling procedures, laboratory determinations of design parameter, foundation design, and settlement analysis. *Preq:* CE 330.

432, 632 Construction Project Administration 3(3,0) Development of fundamental concepts involved in the technical management of the construction phase of engineering projects. *Preq:* CE 324 or equivalent.

433, 633 Construction Planning and Scheduling 3(3,0) Principles and applications of the Critical Path Method (CPM) and Project Evaluation and Review Techniques (PERT). Project breakdown and network graphics. Identification of the critical path and resulting floats. Definition and allocation of materials, equipment, and manpower resources. Resource leveling, compression, and other network adjustments. Computer applications using packaged routines *Preq:* CE 324 or equivalent.

434, 634 Construction Estimating and Project Control 3(3,0) Specifications, contracts, and bidding strategies. Purchasing and subcontracting policies. Accounting for materials, supplies, subcontracts, and labor. Procedural details for estimating earthwork, reinforced concrete, steel, and masonry. Overhead and profit items. *Preq:* CE 324 or equivalent.

435, 635 Engineering Project Analysis 3(2,2) Advanced analysis of engineering projects. Theory of economic, financial and intangible analysis of large-scale construction projects. Practical exercises in cost-benefit studies and construction decisions. *Preq:* Consent of instructor.

438, 638 Construction Support Operations 3(3,0) Description of activities necessary for the completion of a construction job although not specifically recognized as direct-construction activities. Work improvement, safety, security, quality assurance. Organizational support features and typical implementation procedures. *Preq:* CE 324 or equivalent.

439, 639 Construction Equipment Selection and Maintenance 3(3,0) Methodology of selecting the right equipment of the right size for each task of the construction job on the basis of power-train characteristics, crew size, terrain conditions, and job requirements. Cycle time, costs, specifications, maintenance, replacement policy, monitoring. *Preq:* CE 324 or equivalent.

453, 653 Structural Analysis II 3(3,0) Analysis of statically indeterminate structures, including continuous beams, trusses and frames by virtual work, Castigliano's theorems, three-moment equation, moment distribution, and slope deflection. Influence lines for statically indeterminate structures. Muller-Breslau principle Approximate methods for indeterminate frames. Solution of indeterminate trusses and frames using microcomputers. Introduction to matrix structural analysis. *Preq:* CE 205, 301.

462, 662 Coastal Engineering I 3(3,0) Introduction to coastal and oceanographic engineering principles, including wave mechanics, wind-wave generation and propagation, wave-structure interaction, coastal-water level fluctuations, coastal structures, and coastal-zone processes. *Preq:* EM 320.

464, 664 Physical Models in Fluid Mechanics 3(2,2) Classical techniques of dimensional analysis and similitude are presented for fluid mechanics problems with actual construction of an operating physical model to solve a practical engineering problem. Problem will be chosen from the areas of coastal engineering, waste heat disposal, water quality, and river mechanics. Experimental design and instrumentation will be covered in detail. *Preq:* EM 320.

480, 680 Wind Engineering 3(2,2) Study of the effects of wind forces on buildings, bridges, and other structures, including meterological aspects of wind generation, aerodynamics of flow around buildings, structural responses and environmental flows. *Preq:* CE 301, EM 320.

482, 682 (ESE) Groundwater and Contaminant Transport 3(3,0) See ESE 482.

490, H490, 690 Special Projects 1-3(1-3,0) Studies or laboratory investigations on special topic in civil engineering field which are of interest to individual students and staff members. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. *Preq:* Senior standing.

801 Matrix Methods of Structural Analysis 3(3,0)

802 Prestressed Concrete Analysis and Design 3(3,0)

803 Reinforced Concrete Structural Systems 3(3,0)

804 Theory of Plates and Shells 3(3,0)

805 Plastic Analysis and Design of Steel Structures 3(3,0)

806 Metal Compression Members 3(3,0)

807 Numerical and Approximate Methods in Structures 3(3,0)

808 Finite Element Method in Engineering 3(3,0)

810 Dynamic Analysis of Structures 3(3,0)

811 Highway Geometric Design 3(2,3)

812 Airphoto Interpretation II 3(2,3)

813 Highway and Airport Pavement Design 3(3,0)

814 Traffic Flow Theory 3(3,0)

815 Transportation Safety Engineering 3(3,0)

816 Highway Planning 3(3,0)

817 Mass Transit Planning 3(3,0)

818 Airport Planning and Design 3(3,0)

819 Transportation Research 2-4

822 Aggregates and Concretes for Construction 3(3,0)

824 Construction and Performance of Concrete 3(3,0)

830 Advanced Soil Mechanics 3(3,0)

831 Foundation Engineering 3(3,0)

832 Reliability Analysis and Design in Civil Engineering 3(3,0)

835 Construction Project Modeling and Control 3(3,0)

837 Construction Specifications and Contracts 3(3,0)

840 Industrial Construction 3(3,0)

846 Flow in Open Channels 3(3,0)

850 Theory of Plates and Shells 3(3,0)

852 (EM) Finite Element Analysis 3(3,0)

860 Advanced Fluid Mechanics 3(3,0)

861 Mechanics of Sediment Transport 3(2,2)

862 Heat Transfer at Water Surfaces 3(3,0)

863 Coastal Engineering II 3(3,0)

865 Hydrologic Systems Analysis 3(3,0)

866 Advanced Hydrologic Systems Analysis 3(3,0)

871 Coastal Hydrodynamics 3(3,0)

872 Marine Pollution Control 2(2,0)

875 Numerical Models and Hydraulics 3(3,0)

889 Special Problems I 1-3

890 Special Problems II 1-3

891 Master's Research. Credit to be arranged.

893 Selected Topics in Civil Engineering 1-6(1-6,1-6)

991 Doctoral Research. Credit to be arranged.

CLEMSON/FURMAN (CF)

801 Research and Communication 3(3,0)

802 Managerial Economics 3(3,0)

803 Statistical Analysis of Business Operations 3(3,0)

804 Managerial Accounting and Information Systems 3(3,0)

805 Legal and Social Environment of Business 3(3,0)

806 Operations Management 3(3,0)

807 (FIN) Financial Management 3(3,0)

808 Managerial Problems in Marketing 3(3,0)

809 Organization Theory and Behavior 3(3,0)

810 Managerial Policy 3(3,0)

811 International Business Management 3(3,0)

812 Financial Markets and Institutions 3(3,0)

813 Industrial Relations 3(3,0)

814 Directed Research in Quantitative Analysis 3(3,0)

815 Directed Research in Qualitative Analysis 3(3,0)

816 Economics of Property Rights 3(3,0)

817 Business Forecasting Techniques and Applications 3(3,0)

821 Business Taxation 3(3,0)

822 Corporate Financial Reporting 3(3,0)

823 International Accounting 3(3,0)

830 Investment Management 3(3,0)

831 Computer-Assisted Financial Management 3(3,0)

889 Organization Design and Theory 3(3,0)

890 Topics in Strategic Management 3(3,0)

COACHING EDUCATION (CED)

Assistant Professor: R. D Hefley

351 Scientific Basis and Physiological Foundations of Coaching 3(3,0) Designed to increase understanding of basic scientific information concerning athletic performance by utilizing the conceptual approach. Students will study the basic scientific principles of physiology and how they can be applied to conditioning programs for the athlete Phases or physical training are covered along with evaluation of modern training devices. Not open to students who have taken CED 341. *Preq:* BIOL 103 and 105 or consent of instructor

352 Scientific Basis and Kinesiological Foundations of Coaching 3(3,0) Designed to increase the student's understanding of basic scientific information concerning athletic movement by utilizing the conceptual approach. Deals with the basic laws of human motion necessary in evaluation of athletic movement, utilizing joint structure and anatomic landmarks as a basis for motion. *Preq:* CED 351 or consent of instructor.

353 Theory of Prevention and Treatment of Athletic Injuries 3(2,3) Designed to increase the student's understanding of principles involved in the prevention and treatment of athletic injuries. Deals with basic anatomy, first aid, and diagnostic techniques necessary for the student's understanding of basic athletic training procedures. *Preq:* CED 351 and 352 or consent of instructor.

361 Administration and Organization of Athletic Programs 3(3,0) Study of modern techniques and practices used in administering athletic programs. Major emphasis areas such as practice and game organization, purchase and care of equipment, budget and finances, public relations, and legal liability in athletic programs are presented.

362 Psychology of Coaching 3(3,0) Study of psychological techniques utilized to promote maximum athletic performance. Areas of emphasis include motivation, coaching philosophy, athletic personality, mental preparation, and goal-oriented behavior. Not open to students who have taken CED 342. *Preq:* ED 302 or PSYCH 201 or consent of instructor.

371 Coaching Baseball 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of baseball by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development will also be covered as it pertains to specific level of competition. *Preq:* CED 351 or consent of instructor.

372 Coaching Basketball 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of basketball by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development will also be covered as it pertains to specific levels of competition. *Preq:* CED 351 or consent of instructor.

373 Coaching Cross Country 1(0,3) Designed to increase understanding of technical and practical information concerning the coaching of cross country by utilizing the conceptual approach Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development will also be covered as it pertains to specific levels of competition. *Preq:* CED 371 or consent of instructor

374 Coaching Football 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of football by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development will also be covered as it pertains to specific levels of competition. *Preq:* CED 351 or consent of instructor

375 Coaching Soccer 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of soccer by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development will also be covered as it pertains to specific levels of competition. *Preq:* CED 351 or consent of instructor.

376 Coaching Strength and Conditioning 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of strength and conditioning by utilizing the conceptual approach. Students will study basic principles of coaching, training program, and equipment appraisal as a means to improve athletic performance. Total program development will also be covered as it pertains to specific levels of comepetition. *Preq:* CED 351 or consent of instructor

377 Coaching Track and Field 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of track and field by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development also will be covered as it pertains to specific levels of competition. *Preq:* CED 351 or consent of instructor

378 Coaching Volleyball 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of volleyball by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development will also be covered as it pertains to specific levels of competition. *Preq:* CED 351 or consent of instructor

379 Coaching Wrestling 1(0,3) Designed to increase understanding of basic technical and practical information concerning the coaching of wrestling by utilizing the conceptual approach. Students will study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances Total program development will also be covered as it pertains to specific levels of competition *Preq:* CED 351 or consent of instructor

COLLEGE OF EDUCATION (COLED)

480, 680 (AGED, ED, INED) Educational Applications of Microcomputers 3(3,0) Introductory computer literacy course for teachers. Computer-assisted instruction, software, hardware, and educational applications will be covered. *Preq:* Senior standing/graduate in Education.

482, 682 (AGED, ED, INED) Advanced Educational Applications of Microcomputers 3(2,2) Course is designed to provide students with the knowledge and skills needed to apply microcomputer technology to the utilization and generation of educational software in accordance with sound educational principles *Preq:* COLED (AGED, ED, INED) 480

COMMUNITY AND RURAL DEVELOPMENT (CRD)

(See courses listed under Agricultural Economics and Rural Sociology)

Professors: B. L. Dillman, M. S. Henry, J. C Hite, E. L. McLean, B. H Robinson, *Head*

357 Natural Resources Economics 3(3,0)F The principles and problems involved in the use of soil, water, forest, and mineral resources, with special emphasis on economic aspects of alternative methods of resource utilization. *Preq:* AGEC 202, ECON 200 or 211

411, 611 (AGEC) Regional Impact Analysis 2(2,0)F Techniques for analysis of the growth and decline of regions including economic-base theory, shift share, regional input-output, regional econometric models, and fixed impact models. *Preq:* AGEC 202 or ECON 211 and 212.

412, 612 (AGEC) Spatial Competition and Rural Development 2(2,0)S Development of rural activity in the context of historical, theoretical, and policy aspects of friction associated with spatial separation. Location factors, transfer costs, location patterns, and regional-growth policy are considered. *Preq:* AGEC 202 or ECON 212.

491 (AGEC) Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) Internship under faculty supervision in an approved agency or firm. An internship is designed to provide students with work experience in agribusiness or community and rural development. Student will submit a comprehensive report within one week of the end of the internship. A maximum of 6 internship credits may be earned. *Preq:* Junior standing and/or consent of instructor.

COMPARATIVE LITERATURE (CLIT)

403 Modern Studies 3(3,0) Comparative studies in modern literature. *Preq:* Two years study of a foreign language and six credits in literature.

COMPUTER ENGINEERING

(See Electrical and Computer Engineering)

COMPUTER SCIENCE (CPSC)

Professors: S. T. Hedetniemi, E. W. Page III, J. C. Peck, A. J. Turner, Jr., *Head; Associate Professors:* R. M. Geist III, H. C. Grossman, S. M. Hedetniemi, R. R. Little, A. W. Madison, D. E. Stevenson, J. M. Westall, Jr., *Assistant Professors:* K. R. Allen, D. H. Hutchens, R. P. Pargas, D. J. Pokrass, M. K. Smotherman; *Instructors:* R. A. Allen, W. M. Hollis, G. A. Tagliarini; *Lecturers:* A. C. Connor, E. O. Hare, C. F. Pellerin, H. A. Pellerin, H. C. Sellers; *Visiting Instructor:* E. D. Wooster

101, H101 Computer Science I 4(3,2) Introduction to modern problem solving and programming methods. Special emphasis is placed on algorithm development and software life cycle concepts. A general survey of basic hardware and software concepts is included. Intended for students who plan to concentrate in computer science or a related field. *Preq:* MTHSC 105 or satisfactory score (550) on the Mathematics Test, Level II (standard) or consent of instructor.

102, H102 Computer Science II 4(3,2) Continuation of CPSC 101, with continued emphasis on problem solving and program development techniques. Typical numerical, nonnumerical, and data processing problems will be examined. Basic data structures will be introduced. *Preq:* CPSC 101.

110, H110 Elementary Computer Programming 3(3,0) Introduction to computer programming and its use in solving problems, intended primarily for technical majors. The FORTRAN programming language will be used. (Credit may not be received for both CPSC 110 and 150.)

120 Introduction to Information Processing Systems 3(2,2) Introduction to the techniques, principles and concepts of modern information processing systems and microcomputers, intended primarily for nontechnical majors. Topics include information processing packages and applications, usage of typical information processing packages, digital computers, programming fundamentals and languages, and implementation of computer programs.

130 Data Processing with Cobol 3(3,0) Introduction to data processing techniques and applications. Emphasis is placed on the organization and processing of data files. The COBOL programming language is used. *Preq:* CPSC 110 or 120, or equivalent.

150 Introductory FORTRAN Programming 1(1,0) Introduction to computer programming in the FORTRAN programming language. Credit may not be received for both CPSC 110 and 150. *Preq:* Knowledge of a computer programming language.

151 Introductory PL/I Programming 2(2,0) Introduction to computer programming in the PL/I language. *Preq:* Knowledge of a computer programming language.

152 Introductory Pascal Programming 2(2,0) Introduction to computer programming in the Pascal language *Preq:* Knowledge of a computer programming language

154 Introductory Snobol Programming 1(1,0) Introduction to computer programming in the Snobol language *Preq:* Knowledge of a computer programming language

155 Introductory RPG Programming 1(1,0) Introduction to computer programming in the RPG language. *Preq:* Knowledge of a computer programming language

156 Introductory Basic Programming 1(1,0) Introduction to computer programming in the Basic language *Preq:* Knowledge of a computer programming language

157 Introduction to C Programming 1(1,0) Introduction to computer programming in the C programming language. Credit may not be received for both CPSC 157 and 260. *Preq:* Knowledge of a computer programming language.

210, H210 Programming Methodology 4(3,2) Introduction to programming techniques and methodology Topics include structured programming, stepwise refinement, program design and implementation techniques, modularization criteria, program testing and verification, basic data structures, and analysis of algorithms. Credit may not be received for both CPSC 102 and 210. *Preq:* CPSC 110 or 130, or ENGR 180, or equivalent.

230 Assembly Language Programming 3(3,0) Introduction to computer organization, machine language, and assembly language programming. The organization, machine language and assembly language of the IBM 370 will be studied. *Preq:* CPSC 101 or 110, or equivalent

240, H240 Introduction to Data Structures 3(3,0) Basic concepts of data structures such as queues, stacks, and lists. This course includes the study of algorithms for the manipulation of data structures, the implementation of these algorithms in existing programming languages, and applications such as storage allocation and garbage collection. *Preq:* CPSC 102 or 210. *Coreq:* MTHSC 219

250 Advanced Fortran Programming 2(2,0) Continuing study of programming and problem solving using the Fortran language. Topics such as the use of data files and plotting will be included. *Preq:* CPSC 110, 120, or 150; or equivalent.

251 Advanced PL/I Programming 2(2,0) Study of the advanced features of the PL/I language. Topics such as file processing, dynamic storage allocation and compile-time facilities will be included *Preq:* CPSC 151 or equivalent.

253 APL Programming 1(1,0) Introduction to computer programming in the APL language. *Preq:* CPSC 210 or consent of instructor

260 Production Systems Environment 3(3,0) Introduction to the environment typically encountered in large-scale data processing applications. Topics include the use of control languages to schedule the execution of programs and manage files. (Credit may not be received for both CPSC 157 and 260.) *Preq:* CPSC 102 or 210.

330 Computer Systems Organization 4(3,2) Introduction to the structure and programming of computer systems Various hardware/software configurations are explored and are presented as integrated systems Topics include basic computer organization, input/output organizations, interrupt processing and system software *Preq:* CPSC 230 and MTHSC 219

332 Computer Systems 3(3,0) Introduction to the design, integration, and use of hardware and software components in standard computer systems Emphasis will be placed on computer organization at the component level, interfacing, basic operating system functions, and system utilities Credit may not be received for both CPSC 332 and 422 *Preq:* CPSC 230 and MTHSC 219, or equivalent

360 Peripherals and File Design 3(3,0) Study of peripheral devices and data management as a basis for the design of information systems. Traditional data processing applications will be presented and evaluated in terms of efficiency and effectiveness Problems using standard file organization and access techniques will be assigned *Preq:* CPSC 240 and 260 or consent of instructor

371 Systems Analysis 3(3,0) Incorporates a study of the decision-making process at all levels with the logical design of information systems. Extensive study of the system life cycle with emphasis on current as well as classical techniques for describing data flows, data structures, file design, etc. *Preq:* CPSC 360.

422, H422, 622 Introduction to Operating Systems 3(3,0) Detailed study of the management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. Credit may not be received for both CPSC 332 and 422 *Preq:* CPSC 230 and 360, or equivalent.

423, H423, 623 Implementation of Operating Systems 3(2,2) Detailed review of the implementation of an existing, multi-tasking operating system. Extension of concepts in laboratory to development and implementation of a system nucleus supporting milti-tasking and process coordination on an actual computer system. Emphasis is given to design decisions as they apply to performance and complexity. *Preq:* CPSC 332 or 422, or equivalent

428, H428, 628 Design and Implementation of Programming Languages 3(3,0) Overview of programming language structures and features and their implementation. Control and data structures found in various languages will be studied. Runtime organization and environment and implementation models will also be included. *Preq:* CPSC 230 and 240 or equivalent

429, H429, 629 Translation of Programming Languages 3(3,0) Techniques and considerations for compiling and interpreting programming languages. Topics include scanning, parsing, optimization, code generation and their theoretical foundations. The implementation of a compiler or a major component of a compiler normally will be a term project. *Preq:* CPSC 422, 428.

430, 630 Computer Performance Evaluation 3(3,0) Computer hardware and software measurement and evaluation in selection and improvement. Topics include measurement tools, analytic and simulation models, workload models, and program performance. *Preq:* CPSC 332 or 422 and MTHSC 301; or equivalent.

435, 635 Microprogramming 3(3,0) Software development at the microprogram level. Topics include organization of microprogrammed computers, emulation, interpreter design, and high-level language support. A survey of microprogrammable machines is also included. *Preq:* CPSC 330 and 422; or consent of instructor.

450, 650 Theory of Computation 3(3,0) Introduction to models of computation and machine description languages, including finite-state automata and regular expressions, pushdown automata and context-free languages, and Turing machines and recursive functions. Topics include equivalence and relative computing power of the models studied, enumeration, Church's thesis, and undecidability problems. *Preq:* E&CE 352 or MTHSC 219 or consent of instructor.

462, H462, 662 Database Management Systems 3(3,0) Introduction to database/data communications concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining and accessing multiple-user data bases will be presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems will be made. *Preq:* CPSC 360 and MTHSC 219.

463, 663 Online Systems 3(3,0) Provides an indepth study of the design and implementation of transaction processing systems and an introduction to basic communications concepts. A survey of commercially available software and a project using one of the systems are included. *Preq:* CPSC 462.

464, 664 Introduction to Computer Architecture 3(3,0) Survey of von Neumann computer architecture at the instruction-set level. Fundamental design issues will be emphasized and will be illustrated using historical and current mainframe, supermini, and micro architecture. *Preq:* CPSC 330 or consent of instructor.

472, 672 Software Development Methodology 3(3,0) Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured walk-throughs will be discussed and used in a major project. The emphasis of this course is on the application of these techniques to large-scale software implementation projects. Additional topics such as mathematical foundations of structured programming and verification techniques will also be included. *Preq:* CPSC 240, 360.

480, 680 Fundamentals of Computer Science 3(3,0) Fundamental concepts of computers and programming, intended primarily for Computer Science graduate students without an undergraduate degree in Computer Science. Topics include machine organization, assembly language programming, programming systems, and data management. May not be taken by those who have completed CPSC 230. *Preq:* Expertise in programming in a high-level language and consent of instructor.

481, H481, 681 Special Topics in Computer Science 1-3(1-3,0) Areas of computer science in which nonstandard problems arise. Innovative approaches to problem solution which draw from a variety of support courses will be developed and implemented. Emphasis will be placed on independent study and projects. *Preq:* Consent of instructor.

491 Senior Seminar in Computer Science 1(1,0) Series of seminars on professional and post-baccalaureate opportunities in computer science, new and emerging fields in computer research, interview techniques, professional development, ethics, social implications. To be taken on Pass/Fail only. *Preq:* CPSC 360 or consent of instructor.

740 Computer Science for High School Teachers I 3(2,2)

741 Computer Science for High School Teachers II 3(2,2)

810 Introduction to Artificial Intelligence 3(3,0)

820 Parallel Architectures, Languages, and Algorithms 3(3,0)

823 Operating Systems Design 3(3,0)

824 Advanced Operating Systems 3(3,0)

825 Software Systems for Data Communications 3(3,0)

827 Introduction to Formal Languages 3(3,0)

828 Theory of Programming Languages 3(3,0)

830 Systems Modeling 3(3,0)

838 Advanced Data Structures 3(3,0)

840 Design and Analysis of Algorithms 3(3,0)

862 Database Management Systems Design 3(3,0)

864 Computer Architecture 3(3,0)

872 Software Design and Programming Methodology 3(3,0)

873 Software Verification, Validation, and Measurement 3(3,0)

881 Special Topics 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

981 Seminar in Computer Science 1-3(1-3,0)

991 Doctoral Research. Credit to be arranged.

DAIRY SCIENCE (DYSC)

Professors: J. F. Dickey, B. F. Jenny; *Associate Professors:* A. B. Bodine II, J. A. Collins, D. D. Lee, Jr., *Head; Assistant Professor:* J. C. Hoskin; *Instructor:* M. E. Richardson; *Visiting Professor:* G. D. O'Dell

101 Dairy Foods 1(1,0) F, S Dairy foods such as ice cream, yogurt, and various cheeses; the use of these foods for nutrition and pleasure. Sampling of various products will take place throughout the course

102 Mammalian Reproduction 1(1,0) S Physiology and endocrinology of the reproductive processes in male and female mammals with emphasis on farm animals. Control of reproductive cycles, diseases, sexuality, and effects of drugs on reproduction will be discussed

201 Introduction to Dairy Science 3(3,0) F The basic principles of dairy production and manufacturing. Topics include the breeding, feeding, and management of dairy cattle, quality control of milk, and the processing of milk and dairy products.

203 Dairy Science Techniques 1(0,3) F Laboratories designed to demonstrate the basics of breeding, feeding, and management of dairy cattle, quality control of milk, and processing of milk and dairy products. *Preq:* To be taken concurrently or to follow DYSC 201.

304 Evaluation of Dairy Products 2(1,3)S Emphasis placed on sensory evaluation of dairy products. Discussion of basic principles of organoleptic evaluation, fundamental rules for scoring and grading dairy products. Evaluation of all classes of dairy products, based on established grades and score cards. *Preq:* Consent of instructor

310 Dairy Cattle Selection 1(0,3)S Emphasis placed on the selection of dairy cattle for profitable herd operations. Evaluations of herd classification, fitting, showing, and true type are made.

400, 600 Cultured Dairy Products 3(2,3)S Odd-numbered years. Basic principles of microbiological culture propagation, types of lactic cultures, their properties and uses, as well as processing procedures, quality control, and compositional and organoleptic characteristics of cultured dairy products will be discussed. The laboratory phase will include inplant experience with culture propagation and product manufacture. *Preq:* MICRO 305 or consent of instructor.

401 Special Problems 1-3(0,3-9) Problems of special interest to students in the junior or senior year The course is designed to give experience with and independent study of selected dairy problems not covered in depth in other courses. May be repeated for a maximum of 6 credits. *Preq:* Consent of instructor

402, 602 Dairy Manufacturers 3(2,3)F Odd-numbered years. The principles and practice of the manufacture of ice cream and related dairy products; the principles of the manufacture of condensed and evaporated milks and milk powders; and the physical, chemical, and biological factors involved. *Preq:* Consent of instructor.

403, 603 Laboratory Techniques 3(2,3)F Research and quality control techniques commonly used in dairy science and related agri-sciences. *Preq:* CH 101, 102, or consent of instructor

404, 604 Plant Management 2(2,0)S Even-numbered years. The organization and operation of dairy and food plants and the coordination of all functions into an orderly business enterprise. Emphasis will be given to management's responsibility concerning the procurement, processing, quality control and distribution of food products. Business and industrial techniques are used to develop maximum efficiencies. *Preq:* DYSC 201 or consent of instructor.

407, H407, 607 Market Milk 3(3,0)F Composition, procurement, processing, distribution, quality control, public health aspects, basic chemistry and microbiology of industrial milk supplies and cultured products. *Preq:* DYSC 201 or consent of instructor.

409 Dairy Science Seminar 2(2,0)F Odd-numbered years. Special research problems in production and manufactures are studied. Individual topics not fully covered in classwork are assigned for special report before class and members of Dairy Science staff

452, 652 Dairy Cattle Feeding and Management 4(3,3)S Odd-numbered years. Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general consideration in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and management of the milking herd and feeding for milk production. *Preq:* DYSC 201 or consent of instructor.

453, H453, 653 Animal Reproduction 3(3,0)F Reproductive physiology and endocrinology of mammals with emphasis on farm animals and frequent reference to reproduction in laboratory animals and humans. *Preq:* Consent of instructor.

455, 655 Animal Reproductive Management 1(0,3) Physiology and endocrinology of the pregnant and nonpregnant cow are discussed. Emphasis is placed on methods of artificial insemination, pregnancy detection, and computer recordkeeping for achieving a high level of reproductive efficiency. *Preq:* To be taken concurrently or to follow DYSC 453.

461, 661 Physiology of Lactation 2(2,0)F Anatomy and development of the mammary gland; physiological and biochemical regulation of mammary growth and milk secretion with emphasis on farm animals and reference to other mammals. *Preq:* BIOCH 210, CH 223, or consent of instructor.

490 Practicum 1-4 Supervised dairy science learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Sophomore standing and consent of instructor.

801 Topical Problems 1-3

803 Physiology of Reproduction and Milk Secretion 3(3,0)

808 Industrial Dairy Science 3(3,0)

820 Dairy Science Graduate Seminar 1(1,0)

891 Master's Research. Credit to be arranged.

ECONOMICS (ECON)

Professors: R. C. Amacher, D. K. Benjamin, D. W Blair, R D. Elliott, D. F. Gordon, C M Lindsay, M. T. Maloney, *Head;* R. E McCormick, R. B. McKenzie, R E Meiners, R D. Shannon, B. R. Skelton, G. R. Thompson, H. H. Ulbrich, M. S. Wallace, J T. Warner, T B. Yandle, Jr.; *Associate Professors:* D. N. Laband, C. Nardinelli; *Assistant Professors:* W. F Chappell, C. A. Diamond, Jr., M. S. Gerety, D. L. Placone, C. J. Simon; *Instructors:* R. C. Clement, M. Tinsley; *Visiting Assistant Professor:* E. S. Kelly

101 Economics in Our Times 1(1,0) A nontechnical introduction to economics based on an examination of current issues and problems for students who have not taken ECON 200, 211, or 212. Does not count toward the requirements of the major or minor in Economics.

200 Economic Concepts 3(3,0) Comprehensive course including both micro- and macro-economic concepts for the student not having theoretical course requirement beyond the principles level or for the student expecting to take a selected group of the 300-level courses in economics. Credit will not be given to students who have already completed ECON 211 or 212

203 Consumer Economics 2(2,0) Presentation of information and material to facilitate consumer decision making in such areas as home finance, insurance, banking, investments, taxation, budgeting and other areas of immediate concern to the American consumer

211, H211 Principles of Economics 3(3,0) Intensive study of the economics of the firm, pricing of resources, and international economic relations. Theory is given relevance through the analysis of current economic problems.

212, H212 Principles of Economics 3(3,0) Fundamental principles of pricing, stabilization, and growth in a modern economy Topics include supply and demand, employment theory and fiscal policy, banking system and monetary policy, and economics of growth.

301 Economics of Labor 3(3,0) Economics of the labor market, the problems of the industrial worker, and the methods of adjusting labor-management disputes. *Preq:* ECON 200 or 211, 212

302, H302 Money and Banking 3(3,0) Considers the function of money and banking in both the product and financial markets. Special emphasis is placed on monetary theory and current problems of monetary policy *Preq:* ECON 211 and 212, or 200 and consent of instructor

304 (FIN) Risk and Insurance 3(3,0) See FIN 304

305 (FIN) Investment Analysis 3(3,0) See FIN 305

308 Collective Bargaining 3(3,0) Practices, procedures, legal foundations, and legal structure associated with collective bargaining. The form and content of the labor contract, the grievance machinery, and the mediation and arbitration institutions will also be studied *Preq:* ECON 200 or 211

309 Government and Business 3(3,0) Relationships between government and business, including among other topics, governmental efforts to enforce competition; to regulate public utilities, and to protect the special interests of laborers, farmers, and consumers *Preq:* ECON 200 or 211

311, 611 (MASC) Introduction to Econometrics 3(3,0) Elements of time series analysis and introduction to the measurement, specification, estimation and interpretation of functional relationships through single equation least square techniques Problems of multicollinearity, dummy variables, heteroscedasticity, autocorrelation, and lagged variables in simple economic models are introduced *Preq:* ECON 314, MTHSC 301

314, H314 Intermediate Economic Theory 3(3,0) Analytical study of the basic concepts of value and distribution under alternative market conditions *Preq:* ECON 211 and 212, or 200 and consent of instructor

403, 603 Development of Economic Thought 3(3,0) Study of the origin and evolution of economic ideas with some emphasis on the historical context, the problems which inspired these ideas, and the nature of the solutions which they provided from ancient days to the present. *Preq:* ECON 200 or 211, 212.

404, 604 Comparative Economic Systems 3(3,0) A comparative analytical and historical study of the principal economic systems which have been important in the modern world including among others, capitalism and socialism. *Preq:* ECON 200 or 211

407, H407, 607 National Income and Employment Analysis 3(3,0) Macroeconomic problems of inflation and unemployment form the focal points. Statistics (GNP and the Consumer Price Index) and theory (Classical, Keynesian, and Monetarist views) will be included. Pertinent public policies designed to deal with these problems will be analyzed *Preq:* ECON 200 or 212.

408, 608 Arbitration 3(3,0) Analysis of dispute settlement procedures with specific emphasis on mediation, factfinding, and arbitration as they are used to resolve labor-management disputes in the public and private sectors *Preq:* Consent of instructor

409, 609 (MGT) Managerial Economics 3(3,0) Use of tools of economic analysis in classifying problems, in organizing and evaluating information, and in comparing alternative courses of action. Bridges the gap between economic theory and managerial practices. *Preq:* MASC 310 or ECON (MASC) 311, or consent of instructor

410, 610 Economic Development 3(3,0) Consideration and analysis of economic and related problems of the underdeveloped countries Attention will be given to national and international programs designed to accelerate solution of these problems. *Preq:* ECON 200 or 211, 212.

412, H412, 612 International Trade and Finance 3(3,0) Analysis of the principles governing trade between nations. Topics include trade theory, comparative advantage, theory and practice of commercial policy, balance of payments, determination of exchange rates, interaction of foreign and domestic sectors, price and income effects of trade, multinational corporations, and economic integration. *Preq:* ECON 211 and 212, or consent of instructor

419, 619 Economics of Defense 3(3,0) Examines the American defense establishment in terms of resources utilized, alternative uses, and the contribution to the national economy and scientific progress generated by resources in a defense use. Discussed are economic problems inherent in shifting resources between defense and nondefense uses and among alternative defense uses. *Preq:* ACCT 200 or 201, ECON 200 or 211

420, H420, 620 Public Sector Economics 3(3,0) Study of the role of government and its proper functions and limitations in a market. Provision of goods and services by all levels of government and instruments of taxation are evaluated according to efficiency and equity criteria. Contemporary public sector issues are emphasized throughout. *Preq:* ECON 314 or consent of instructor.

421, 621 Urban Economics 3(3,0) Economic problems associated with the concentration of population in central places are examined. Economic reasons for the development of cities are studied and models of urban location and growth are analyzed. A major emphasis of the course is on the identification and evaluation of alternative solutions to urban economic problems. *Preq:* ECON 200 or 211, 212.

422, H422, 622 Monetary Theory and Policy 3(3,0) An intensive study of the role of monetary factors in economic change. Modern monetary theories and their empirical relevance for policy are developed against a background of monetary history and institutions. *Preq:* ECON 302 or consent of instructor.

424, H424, 624 The Organization of Industries 3(3,0) Empirical, historical, and theoretical analyses of market structure and concentration in American industry: the effects of oligopoly, monopoly, and cartelization upon price, output and other policies of the firm; antitrust and other public policies and problems will be studied. *Preq:* ECON 314 or consent of instructor.

430 Mathematical Economics 3(3,0) Traditional economic theories are derived using elementary mathematics. Major emphasis is placed upon microtheoretical models. Specialized topics such as cartel theory, national income analysis, price discrimination, and optimization theory over time will be economically analyzed, using mathematical tools. *Preq:* ECON 314, MTHSC 106

498, H498 Current Topics in Economics 3(3,0) Discussion of current topics and research methods in economics. Students will write several short papers on current issues. *Preq:* Consent of instructor.

499, H499 Senior Seminar in Economics 3(3,0) Discussion of topics of current interest in economics. Students will do directed research on a particular topic. *Preq:* Consent of instructor.

750 Economic Concepts and Classroom Applications for Teachers 3(3,0)

751 Current Issues in Economics for Teachers 3(3,0)

801 Microeconomic Theory 3(3,0)

802 Advanced Economic Concepts and Applications 3(3,0)

805 Macroeconomic Theory 3(3,0)

807 (MASC) Econometric Methods I 3(3,0)

808 (MASC) Econometric Methods II 3(3,0)

809 Mathematical Economics 3(3,0)

812 History of Economic Thought 3(3,0)

816 Labor Economics 3(3,0)

817 Public Employee Labor Relations 3(3,0)

820 Public Sector Economics 3(3,0)

824 Organization of Industry 3(3,0)

825 Economics of Environmental Quality 3(3,0)

826 Economic Theory of Government Regulation 3(3,0)

827 Economics of Property Rights 3(3,0)

831 Seminar in Urban Development Economics 3(3,0)

840 International Trade Theory 3(3,0)

841 International Finance 3(3,0)

850 Monetary Theory 3(3,0)

855 Financial Economics 3(3,0)

888 Directed Reading in Economics 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

900 Seminar in Advanced Economic Theory 3(3,0)

901 (AGEC) Price Theory 3(3,0)

902 (AGEC) Production Economic Problems 2(2,0)

903 (AGEC) General Equilibrium and Welfare Theory 3(3,0)

904 (AGEC) Seminar in Resource Economics 3(3,0)

905 (AGEC) Advanced Macroeconomic Issues 3(3,0)

906 (AGEC) Seminar in Area Economic Development 3(3,0)

907 (AGEC) Agricultural Marketing Problems 2(2,0)

917 (AGEC) Advance Seminar in Labor Economics 3(3,0)

991 (AGEC) Doctoral Research. Credit to be arranged.

EDUCATION (ED)

Professors: I. C. Briscoe, C. R. Freeze, E. B. Galloway, G. W. Gray, *Head;* E. J. Kozma, W. H. Leonard, J. E. Matthews, E. F. Olive, R. K. Peden, W. W. Pennscott, J. H. Walker; *Associate Professors:* D. E. Barrett, A. D. Brooks, S. L. Buckner, A. M. Derr, W. R. Fisk, D. L. Furr, B. L. Griffin, R. P. Green, Jr., J. V. Hamby, L. B. Hart, D. F. Keller, O. R. Lumpkin, B. M. Raetsch, F. C. Raetsch, J. C. Richardson, V. B. Stanley; *Assistant Professors:* M. S. Crosby, R. D. Hefley, R. A. Marion, M. A. Moore; *Lecturers:* C. L. Peters, N. S. Wilkinson; *Visiting Assistant Professors:* G. F. Elrod, C. G. Weatherford; *Visiting Lecturer:* C. L. Rumminger

100 Orientation 1(1,0) Lectures and discussions on teaching in addition to serving as teacher aides. Required of all students in Early Childhood Education, Elementary Education, Secondary Education, and Science Teaching

101 Reading Improvement 1(0,3) Provides an individualized approach to developmental reading skills emphasizing comprehension, vocabulary, and rate

102 Efficient Reading 1(0,3) Extends the reading skills of vocabulary, comprehension, and rate stressing skimming, scanning, flexibility, and critical reading

103 Study Techniques 1(0,3) Aims at individual study skills in the content areas and makes application by using these techniques in college curricula. Priority given to freshmen

301, H301 Principles of American Education 3(3,0) Study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States

302, H302 Educational Psychology 3(3,0) The nature, capacities, equipment, growth, and development of the learner

321 Physical Education for Elementary School: Games and Sports Skills 3(2,3) Values, purposes, and uses of creative games and games of low organization. Basic skills and lead-up activities for children. Methods of instruction and time allotments appropriate for elementary school programs. *Preq:* Junior standing Education major or consent of instructor

334, H334 Child Development 3(3,0) A study of the physical and emotional growth and development of the child.

335, H335 Adolescent Growth and Development 3(3,0) The physical and emotional growth and development of the adolescent.

336 Behavior of the Preschool Child 3(2,3) A study of behavior of the preschool child, including observation and participation. *Preq:* ED 302 or PSYCH 201.

406, 606 Philosophy, Schooling, and Educational Policy 3(3,0) Analysis of the development of contemporary educational theory and its impact on current schooling practices and educational policy development.

412 Directed Teaching in Secondary School Subjects 12(1,33) A program of supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for prospective teachers to obtain experiences in the subject area. Students to be sectioned according to teaching fields: English, history, social sciences, mathematical sciences, modern languages, science. Enrollment is limited.

414, 614 (PRTM) Recreation and Leisure for Special Populations 3(3,0) See PRTM 414.

424 Methods and Materials in Secondary School Instruction 3(3,0) Development of instructional practices and materials appropriate for the secondary school; familiarization with curriculum materials. Students to be sectioned according to teaching area: English, history, social science, mathematical sciences, modern language, science.

425 Methods and Materials in Secondary Modern Language 3(3,0) Development of instructional practices and materials appropriate for secondary modern languages; familiarization with curriculum materials; includes field experiences in local schools. *Preq:* Second semester Junior standing and 2.0 grade-point ratio.

426 Methods and Materials in Secondary Mathematics 3(2,2) Development of instructional practices and materials appropriate for secondary mathematics, familiarization with curriculum materials; includes field experiences in local schools. *Preq:* Second semester Junior standing and 2.0 grade-point ratio.

427 Methods and Materials in Secondary Science 3(2,2)F Development of instructional practices and materials for teaching secondary school science (biological, earth and physical sciences); familiarization with secondary science curriculum materials; includes field experiences in local schools. *Preq:* Second semester Junior standing and 2.0 grade-point ratio

428 Methods and Materials in Secondary Social Studies 3(3,0) Development of instructional practices and materials appropriate for secondary social studies; familiarization with curriculum materials, includes field experiences in local schools in preparation for student teaching *Preq:* Second semester Junior standing and 2.0 grade-point ratio.

429, 629 Teacher As Manager 3(3,0) Course designed to help teachers, principals, and other school personnel solve school problems by identifying and applying selected management techniques, and to better prepare educators for the added responsibilities demanded of them by the movement to measurable improvement in their management of learning.

431, 631 Special Institute Course: Early Childhood Education 1-3(1-3,0) Subject areas organized according to Institute needs.

432, 632 Special Institute Course: Elementary School 1-3(1-3,0) Subject areas organized according to Institute needs.

433, 633 Special Institute Course: Secondary School 1-3(1-3,0) Subject areas organized according to Institute needs.

434, 634 Special Institute Course: Current Problems in Education 1-3(1-3,0) Subject areas organized according to Institute needs.

435, 635 Special Institute Course: Curriculum 1-3(1-3,0) Subject areas organized according to Institute needs.

436, 636 Special Institute Course: Supervision and Administration 1-3(1-3,0) Subject areas organized according to Institute needs.

458 Health Education 3(3,0) Study of the information needed for effective cooperation with parents, physicians and public health agenices in the promotion and improvement of community health, including problems of personal hygiene, health records, immunization, and control of communicable disease.

459 Fundamental Skills for Reading Instruction 3(2,2) Study of language development, preschool and primary reading process, historical development of reading, and basic skills. Laboratory field experiences to be arranged with each individual.

461, H461 Teaching Reading in the Elementary School 3(2,3) Study of the various phases of reading and their relation to the elementary program. Emphasis on modern practices in the classroom teaching of reading Includes observation and participation in the elementary classroom. *Preq:* For student teachers or consent of instructor

462 Diagnostic and Corrective Reading 3(2,3) The purpose of this course is to prepare the prospective classroom teacher for diagnosing and correcting reading problems. Laboratory field experiences will be arranged for each individual. *Preq:* Three semester hours in reading or consent of instructor

466 Introduction to Early Childhood Education 3(3,0) Introductory course for Early Childhood Education, which includes an overview of curriculum for kindergarten and primary grades

469, 669 Characteristics of Children with Emotional Handicaps 3(3,0) Intensive study of the meaning and concepts associated with emotionally handicapped. Analysis of the causes and characteristics of emotionally handicapped. *Preq:* ED 302, or PSYCH 201 and ED 471, or consent of instructor.

470, 670 Characteristics of Children with Learning Disabilities 3(3,0) Nature and extent of perceptual, motor, and conceptual impairments are examined Team functions, community role, and family needs are emphasized. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor

471, 671 The Exceptional Child 3(3,0) Survey of exceptionality including handicapped and gifted children; nature, cause, and treatment of difficulties; educational problems.

472, 672 Psychology of Mental Retardation 3(3,0) Psychological aspects of mental retardation: learning, motivation, and personality development.

473, 673 Teaching the Mentally Retarded 3(3,0) Study, selection, and preparation of curricular materials; methods of teaching retarded children within the preadolescent and adolescent range. *Preq:* ED 472 or equivalent.

474, 674 Educational Procedures for Children with Emotional Handicaps 3(3,0) Major problems of teaching disturbed children: curriculum and instructional modifications, program planning, facility adaptation, behavior controls, articulation with mental health specialists, and procedures to develop readiness for return to regular class *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor

475, 675 Educational Procedures for Children with Learning Disabilities 3(3,0) Special emphasis is given to educational evaluation and remedial procedures designed to improve the individual's learning abilities. A multisensory approach is emphasized geared to individual need. *Preq:* ED 302, ED 471 and PSYCH 201, or consent of instructor

476, 676 Practicum in Learning Disabilities 3(2,3) Designed to provide practical experience in teaching the learning disabled under the supervision of College faculty and local teachers of learning disabilities. *Preq:* ED 470, 471, 475, or consent of instructor

477, 677 Characteristics of Children Who Are Gifted 3(3,0) Course designed to acquaint the student with definitions, incidences, characteristics, identification procedures, and curriculum options for the gifted. *Preq:* ED 471

478, 678 Practicum in Emotionally Handicapped 3(2,3) Designed to provide practical experience in teaching the emotionally disturbed under the supervision of College faculty and local teachers of emotionally handicapped. *Preq:* ED 469, 471, 474, or consent of instructor.

479, 679 Practicum in Mentally Retarded 3(2,3) Designed to provide practical experience in teaching the mentally retarded under the supervision of College faculty and local teachers of mentally retarded. *Preq:* ED 471, 472, 473, or consent of instructor.

480, 680 (AGED, COLED, INED) Educational Applications of Microcomputers 3(3,0) See COLED 480.

481 Directed Teaching in the Elementary School 12(1,33) Supervised observation and teaching experiences in cooperation with selected elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses. *Preq:* Senior standing, 2.0 grade-point ratio, and consent of area coordinator.

482, 682 (AGED, COLED, INED) Advanced Educational Applications of Microcomputers 3(2,2) See COLED 482.

483 Methods and Materials for Early Childhood Education 3(2,3) Study of methods and materials applicable to nursery schools, kindergarten, and early elementary grades. Includes observation and participation in preschool and/or primary grades.

484 Directed Teaching in Early Childhood Education 12(1,33) Supervised observation and teaching experiences in cooperation with nursery, kindergartens, and early elementary schools. Enrollment is limited to seniors or graduates who have completed prerequisite courses and who have the accumulated grade-point ratio for graduation. *Preq:* Senior standing, 2.0 grade-point ratio, and consent of area coordinator.

485 Methods and Curriculum in Elementary Mathematics and Science 3(2,3) Development of understanding, skills, and attitudes in the elementary mathematics and science curricula, with emphasis on strategies, techniques, and materials for teaching elementary mathematics and science. Includes observation and participation in the elementary classroom.

487 Teaching Social Studies in the Elementary School 2(1,3) Provides the preservice teacher with an introduction to the skills of the social studies and the methods, materials, and techniques needed to teach these skills to students in the elementary school. Includes observation and participation in the elementary classroom. *Preq:* Junior standing Education major

488 Teaching the Language Arts in the Elementary School 3(2,3) Provides the preservice teacher with an introduction to the skills of the language arts other than reading and the methods, materials, and techniques needed to teach these skills to students in the elementary school. Includes observation and participation in the elementary classroom. *Preq:* Junior standing Education major

490, 690 Student Management and Discipline 3(3,0) Designed to aid preservice and inservice teacher development and refine knowledge, skills, and values important for managing students in school settings. Practical application of theory and research and legal and ethical considerations will be emphasized. *Preq:* ED 302 or PSYCH 201 and ED 334 or 335 or suitable alternative.

497, 697 Audio-Visual Aids in Education 3(3,0) Techniques and uses of audio-visual aids in improving teaching effectiveness.

498, H498 Secondary Content Area Reading 3(1,4) Designed for preservice teachers who are involved with field experiences prior to student teaching full time. The course is designed to prepare content area teachers to teach the reading skills necessary for effective teaching of content area material. *Preq:* For students enrolled in professional block semester.

705 Foundations of Counseling and Guidance Services 3(3,0)

707 Reading and Independent Study in Education 1-3

720 School Personnel Administration 3(3,0)

721 Legal Phases of School Administration 3(3,0)

723 Field Experiences in Elementary Administration and Supervision 3(1,6)

724 Field Experiences in Secondary Administration and Supervision 3(1,6)

725 Practicum in School System Administration and Supervision 3(1,6)

740 Curriculum Planning for Early Childhood Education 3(3,0)

741 Introduction to Pupil Personnel Services in Higher Education 3(3,0)

742 Psychology of Post-Secondary Populations 3(3,0)

759 Fundamentals of Basic Reading 3(3,0)

760 Curriculum Development in the Elementary School 3(3,0)

761 Reading Instruction in the Elementary School 3(3,0)

762 Reading Diagnosis and Remediation 3(2,3)

763 Middle School Reading 3(3,0)

764 The Role of the Library in the Reading Program 3(3,0)

765 Secondary School Curriculum 3(3,0)

794 School and Community Relationships 3(3,0)

798 Teaching Secondary School Reading 3(3,0)

801 Seminar in Human Growth and Development 3(3,0)

802 Human Development: Psychology of Learning 3(3,0)

803 Advanced Methods of Teaching in the Secondary School 3(3,0)

804 Advanced Methods of Teaching in the Elementary School 3(3,0)

805 The Two-Year College 3(3,0)

808 Educational Tests and Measurements 3(3,0)

809 Analysis of the Individual 3(3,0)

810 Theories and Techniques of Counseling 3(3,0)

811 School Finance 3(3,0)
812 The Counselor as Consultant 3(2,2)
813 Educational and Vocational Informational Service and Placement 3(3,0)
814 Field Experiences in Elementary School Guidance 3(2,3)
815 Field Experiences in Secondary School Guidance 3(2,3)
816 Field Experiences in Post-Secondary Settings 3(2,3)
817 Development of Counseling Skills 3(3,0)
818 Field Problems in School Administration and Supervision of Instruction 3(2,3)
820 Teaching Language Arts to the Exceptional Child 3(3,0)
821 Assessment of the Exceptional Child 3(3,0)
822 Teaching Mathematics to the Exceptional Child 3(3,0)
823 Mainstreaming the Handicapped 3(3,0)
824 Secondary Curriculum Adaptations for the Handicapped 3(3,0)
825 Career-Vocational Education for the Handicapped 3(3,0)
830 Techniques of Supervision—the Public Schools 3(3,0)
834 Educational Evaluation 3(3,0)
840 Program Development and Implementation in Early Childhood Education 3(2,2)
850 Public School Administration 3(3,0)
853 Administration and Supervision of Special Education 3(3,0)
854 Advanced Educational Leadership: Theory and Practice 3(3,0)
855 Business Management in Education 3(2,3)
856 Introduction to School Building Planning 3(2,2)
857 Selected Topics in Educational Administration 1-3(1-3,0)
861 Organization and Supervision of Reading Programs 3(3,0)
862 Clinical Research in Reading 3(3,0)
863 Practicum in Reading 3(2,2)
864 Special Problems in Reading Education 1-3(1-3,0-4)
865 Advanced Diagnosis and Remediation in Reading 3(2,3)
866 The Psychology of Teaching Reading 3(3,0)
867 Advanced Practicum in Reading 3(2,3)
871 Interpersonal and Group Relationships 3(3,0)
881 Individual Testing I 3(3,0)
882 Psychoeducational Evaluator Internship I 3(0,6)
883 Psychoeducational Evaluator Internship II 3(0,6)
884 School Psychology 3(3,0)
885 Individual Testing II 3(3,0)
886 Individual Testing III 3(3,0)
887 Psychoeducational Internship III 3(1,6)
889 (AGED, INED) Research in Education 3(3,0)

ELECTRICAL AND COMPUTER ENGINEERING (E&CE)

Professors: A. W. Bennett, *Head,* C. M. Butler, T. L. Drake, A. L. Duke, D. J. Dumin, L. T. Fitch, B. E. Gilliland, J. N. Gowdy, J. L. Hammond, J. W. Harrison, J. W. Lathrop, J. F. Leathrum, J. Y. Luh, J. D. Spragins, *Associate Professors:* E. G. Baxa, Jr., J. E. Bennett, A. S. Collins, A. A. Girgis, R. E. Ham, J. J. Komo, H. V. Poe, K. F. Poole, R. J. Schalkoff, F. R. Sias, Jr., R. W. Snelsire, *Assistant Professors:* M. A. Bridgewood, D. R. Cochran, Y. J. Kang, E. B. Makram, R. W. Sharstein, A. E. Turner, Y. Zheng; *Lecturer:* D. McAuliff; *Visiting Professor:* R. G. Harley; *Visiting Assistant Professor:* X. Xu

201 Logic and Computing Devices 3(1,4) Study of logic with an introduction to Boolean algebra. Number systems and representation of information. The use of integrated circuits to implement combinational and sequential logic functions and computing elements. The organization and structure of computing systems. *Preq:* Sophomore standing.

202, H202 Electric Circuits I 3(3,0) DC resistive circuits, Kirchhoff's laws, Nodal and Mesh emphasis, independent sources, Thevenin's and Norton's theorems, RC, RL, RCL circuit solutions with initial condition using homogenous or nonhomogenous ordinary differential equations having constant coefficients. Develop sinusoidal steady state solution. *Preq:* PHYS 221. *Coreq:* E&CE 203, MTHSC 208.

203 Electrical Circuits Laboratory I 1(0,2) Laboratory course designed to accompany E&CE 202. Introduction to basic electrical circuits and instrumentation. *Coreq:* E&CE 202.

204 Circuit Analysis Problems I 1(0,3) Analysis and solution of electrical network problems using mesh and nodal analysis. Thevinin's and Norton's theorems and equivalent circuits and other circuit analysis from E&CE 202. *Coreq:* E&CE 202.

250 Principles of Digital Computer Systems 3(2,2) Introduction to minicomputers and microcomputers. Topics include machine organization and operation, information flow within a machine, data types and structures, data transfers and communication with external devices, computer response time, interrelation between software and hardware, memory types, specifying cost-effective small computer systems, application examples, introductory assembly language programming. *Preq:* E&CE 201, ENGR 180 or equivalent.

301, H301 Electric Circuits II 3(3,0) Continuation of the study of electric circuits, including three-phase circuits, complex frequency and network functions, frequency response, two-port parameters, magnetically-coupled circuits, Laplace transforms, and introduction to Fourier series and transforms. *Preq:* E&CE 202. *Coreq:* E&CE 303.

302 Linear Control Systems 3(3,0) Introduction to linear control systems. Topics include plant representation, applications of state variables, time and frequency response, stability, system specification, and system design. *Preq:* E&CE 301.

303 Electrical Circuits Laboratory II 1(0,2) A laboratory course designed to accompany E&CE 301. Characteristics of circuits. *Coreq:* E&CE 301.

304 Circuit Analysis, Problems II 1(0,3) Analysis and solution of AC excited electric network problems using methods of E&CE 202 and E&CE 301. Use of step and impulse input functions. *Coreq:* E&CE 301, MTHSC 208.

307 Basic Electrical Engineering 2(2,0) A first course in electrical engineering to provide non-Electrical Engineering majors with a knowledge of electric circuit theory, both dc and ac. The last five weeks of the semester are devoted to an introduction to digital systems. *Preq:* MTHSC 206, PHYS 221. *Coreq:* E&CE 309.

308 Electronics and Electromechanics 2(2,0) Continuation of E&CE 307. Energy conversion systems are considered, as well as basic electronics, plus instrumentation with emphasis on digital methods. *Preq:* E&CE 307. *Coreq:* E&CE 310.

309 Electrical Engineering Laboratory I 1(0,2) A laboratory designed to accompany E&CE 307. Basic electrical circuits and instrumentation. *Coreq:* E&CE 307.

310 Electrical Engineering Laboratory II 1(0,2) A laboratory designed to accompany E&CE 308. Basic electronics and energy conversion *Coreq:* E&CE 308

317 Random Analysis of Electrical Systems 3(3,0) Introduction to engineering problems of a probabilistic nature Problems will be solved which utilize the concepts of probability space and functions of random variables *Preq:* MTHSC 206.

320 Electronics I 3(3,0) Introduction to p-n junction theory and the concepts of solid-state materials and devices Development of the electrical characteristics of diodes and transistors. Operational characteristics of simple digital circuits *Preq:* E&CE 202, MTHSC 208, PHYS 221

321, H321 Electronics II 3(3,0) Analog diode circuits, low and high frequency response of BJT and FET amplifiers with and without feedback, and operational amplifiers and circuits *Preq:* E&CE 301, 303, and 320 *Coreq:* E&CE 302 and 326

322 Electronics for Computer Engineers 3(3,0) Device models, logic circuits and integrated devices with particular emphasis on digital applications, small signal amplifiers Applications of digital and linear integrated circuits Credit not given to students who have taken E&CE 320 and 321. *Preq:* E&CE 202, 301 or 307, 308.

326 Electronics Laboratory I 1(0,2) Laboratory designed to accompany E&CE 321 Characteristics of different amplifier configurations. *Preq:* E&CE 320 *Coreq:* E&CE 321

329 Computer Systems Structures 3(3,0) Fundamental structures and issues that arise in the analysis and implementation of computer systems. Topics include operating systems structures and data structures and their relationship to computer organization Engineering science background for computer systems design *Preq:* CPSC 210 and E&CE 250.

330, H330 Electrical Systems Analysis 3(3,0) Study of continuous and discrete signals and systems applicable to circuits and control systems Fourier series and Fourier transforms for continuous and discrete signals and systems. Amplitude, frequency, and pulse modulation Continuous time and discrete time filtering. *Preq:* E&CE 301, MTHSC 208.

340 (PHYS) Electromagnetics I 2(2,0) Introduction to electrostatics with applications. Vector analysis, Coulomb's law and forces, electric field, Gauss's law, dielectrics, electric potential, Laplace's equation and solutions. *Preq:* MTHSC 208, PHYS 221

341, H341 (PHYS) Electromagnetics II 2(2,0) Introduction to magnetostatics and electrodynamics with application. Steady electric current, Ohn's law, Joule's law, Ampere's force law, magnetic forces and field, Biot-Savart's law, Boundary conditions, magnetic materials, inductance, magnetic circuits, Faraday's law, electromotive force, Maxwell's equations, electromagnetic waves. *Preq:* E&CE 202, 340.

350 Mini-Micro Computer Programming 3(2,2) Indepth study of software design and implementation as applicable to mini- and micro-computers. Topics include assembly language programming; use of editors, loaders, monitors, etc.; data structure fundamentals and software design methodologies. *Preq:* E&CE 250.

351 Real-Time Application of Digital Computers 3(2,2)S Application and operation of digital computers in a real-time or time-critical environment. Topics include interrupt facilities, analog-to-digital and digital-to-analog signal conversion, digital computer interfaces, on-line acquisition and reduction of data. Software concepts include multitask real-time executives, schedulers, and dynamic resource allocation systems. *Preq:* E&CE 350.

352 Machines, Languages, and Algorithms 3(3,0)S Topics fall into three major areas: discrete structures, formal languages, and finite state models. Emphasis is placed on relating formalisms to practical considerations such as logical design of digital machines and the limitations of machine computation. *Preq:* Junior standing in engineering or the physical sciences, or consent of instructor

360, H360 Electric Power Engineering 3(3,0) Course presents the basic principles of electromagnetic induction and electromagnetic forces developed, synchronous machines, power transformers, electric power transmission and distribution systems, DC motors, induction motors. *Preq:* E&CE 301, 340, 341.

402 Engineering Projects 1(0,2) Knowledge and skills needed by electrical engineers to function as a project leader or team member in an industrial environment. Topics considered include project proposals, planning, operation, and reports. Case studies and role-playing methods of instruction are used. *Preq:* Senior standing in Electrical and Computer Engineering or consent of instructor.

403, 603 Energy Conversion 3(3,0)F Various methods of energy conversion with emphasis on solar energy which includes conversion techniques, storage, applications, systems, and future trends. Other energy conversion methods including fuel cells, magnetohydrodynamics, and nuclear are covered. *Preq:* MTHSC 208, PHYS 222.

404, 604 Semiconductor Devices 3(3,0) Consideration of the principles of operation, the external characteristics, and the applications of some of the more important semiconductor devices presently available. *Preq:* Introductory electronics course.

405, H405 Design Projects in Electrical and Computer Engineering 1-3(0,2-6) Individually defined projects oriented toward providing experience in establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation. Development of student creativity through the solution of open-ended problems. Individual instruction in design methodology. Maximum of 3 credit hours. *Preq:* E&CE 330, consent of project supervisor.

406, 606 Introduction to Microelectronics Processing 3(3,0) Microelectronic processing, MOS and bipolar monolithic circuit fabrication, thick and thin film hybrid fabrication, applications to linear and digital circuits, fundamentals of device design. *Preq:* E&CE 320.

407, 607 VLSI Reliability 3(3,0) Reliability concepts applied to VLSI components. Methods of reliability determination, prediction, and attribute assessment. Failure analysis techniques. Wearout related failure mechanisms. Role of defects and electrical overstress in reliability. Reliability growth through design and process control. *Preq:* E&CE 320.

410, H410, 610 Introduction to Digital Control Systems 3(3,0) Introductory course in digital control theory with microprocessors and minicomputers applications: z-transforms, flow graphs, state variables, stability, system compensation using state variables, root locus, Nyquist's and Routh's criterion, optimal design. Introduction to minicomputer and microcomputer implementation of control algorithms. Computer I/O techniques for control applications, time-response limitations of transfer functions. *Preq:* E&CE 302. *Coreq:* E&CE 451.

411, 611 Electrical Systems 1(0,2) Experimental investigations in the areas of mathematical modeling, transient and steady state reponses of second and higher order systems, Bode plots, Nyquist's plots, modulation, system identification, and Pade's rational function approximations. *Coreq:* E&CE 302, 422.

412 Electrical Machines Laboratory 1(0,2) Selected experiments which will help the student become familiar with characteristics of transformers, dc and ac motors and generators. Measurement techniques and component modeling will be included. *Coreq* or *Preq:* E&CE 419.

414, 614 Analysis of Robotic Systems 3(3,0) Analysis of methods of designing and operating robotic systems for the purpose of advanced automation. On-line identification and description of 3-D objects by digitized images. Off line collision free path planning and on-line collision avoidance traveling using artificial intelligence. *Preq:* E&CE 302 or consent of instructor.

417, 617 Software Design 3(3,0) Indepth study of methodologies and techniques used throughout the software development cycle including analysis, design, implementation, and testing. Additional topics include software development tools and software project management techniques. *Preq:* E&CE 429, MTHSC 219.

418, 618 Power System Analysis 3(3,0) Study of power system planning and operational problems. Subjects covered are load flow, economic dispatch, fault studies, transient stability and the control problems. System modeling and computer solutions are emphasized through class projects. *Preq:* E&CE 301 and 360.

419, 619 Electric Machinery 3(3,0) Performance and characteristics of ac and dc machines during steady-state and transient conditions. Coverage includes dc, induction, synchronous motors and alternators. Modeling and computer simulation are included. *Preq:* E&CE 360.

422, H422, 622 Operational Amplifier Circuits 3(2,2) Analysis and design of circuits, both analog and digital, using operational amplifiers. *Preq:* E&CE 321 or equivalent.

423, 623 Power System Protection 3(3,0) Covers basic requirements of power system protection, relaying principles and the basic techniques of over current, distance, differential and carrier protection, computer coordination and introduction to digital protection are introduced. *Preq:* E&CE 418.

425, 625 Microcomputers Interfacing 3(2,2) Hardware characteristics of microcomputers. Design of microcomputer interfaces involving memory, parallel I/0, serial I/0, interval timers, priority interrupt controllers, DMA controllers. A/D and D/A conversion. Laboratory with individual hands-on design experience. *Preq:* E&CE 201 and 250; or CPSC 330. *Coreq:* E&CE 321 or consent of instructor.

426, 626 Digital Computer Design 3(3,0) Design of high-speed ALU's, control and timing circuitry, memory systems, and I/O circuitry; microprogrammed computer design using bit-slice microprocessors; current hardware topics related to computer design; hands-on design experience; and use of logic analyzer for system debugging. *Preq:* E&CE 429.

428, 628 Modulation and Noise 3(3,0) Course covering the modulation techniques used in modern communication systems. Topics covered are spectral translations, stochastic description of signals and noise, correlation functions, power spectra, amplitude modulation, frequency and phase modulation, pulse amplitude modulation, and impact of noise on systems employing these types of modulation. *Preq:* E&CE 317 or MTHSC 400.

429, 629 Computer Organization 3(3,0) Course in computer organization and architecture. Topics include a review of logic circuits, bus structures, memory organization, interrupt structures, arithmetic units, input-output structures, state generation, central processor organization, control function implementation, and data communication. *Preq:* CPSC 230 or E&CE 250, or consent of instructor.

430, 630 Digital Communications 3(3,0) Course in modern digital communications theory. Topics covered are discrete time signals, discrete Fourier transforms, channel bandwidth, channel distortion, coding of analog information, data signal encoding, introduction to decision theory, matched filter, baseband systems, AM, FM, PM, phase-locked loops, secure communications, and contemporary communications systems. *Preq:* E&CE 317.

431, 631 Digital Electronics 3(2,2) Electronic devices and circuits of importance to digital computer operation and to other areas of electrical engineering are considered. Active and passive waveshaping, waveform generation, memory elements, switching, and logic circuits are some of the topics. Experimentation with various types of circuits is provided by laboratory projects. *Preq:* E&CE 321.

432, 632 Instrumentation 3(3,0)F Theory and analysis of transducers and related circuits and instrumentation. Generalized configurations and performance characteristics of instruments will be considered. Transducer devices for measuring physical parameters such as motion, force, torque, pressure, flow, and temperature will be discussed. *Preq:* E&CE 321 or consent of department head.

433, 633 Sensors and Microcomputer Control for Robots 3(1,4) Study of current robotics technology with emphasis on robots suitable for industrial applications that require locomotion and sophisticated sensors. Class design project will be coordinated to produce a working modular robot. *Preq:* E&CE 425 or consent of instructor.

434, 634 Power Electronics 3(3,0)F Study of electronic devices and systems which are designed to control or regulate large amounts of power. Included are SCR applications to inverters, motors controls, high-current power supplies, frequency converters, etc. Also, high-current switching systems, voltage stabilizers, and other power applications of electronics are considered. *Preq:* E&CE 321.

435, 635 Optoelectronics 3(3,0) Understanding of the design aspects and physical phenomenon forming the basis for devices used in electro-optical systems is provided. Topics include LEDs, laser diodes, detectors, noise electro-optic devices, acousto-optic devices, and system aspects. *Preq:* E&CE 320, E&CE (PHYS) 340, 341.

436, 636 Radiation and Wave Propagation 3(3,0)F Study of the theoretical and practical aspects of transmission lines, wave-guides, plane electromagnetic waves, and antennas. Smith chart applications and impedance matching considerations are included. *Preq:* E&CE (PHYS) 341 or equivalent.

437, 637 Laser Technology and Applications 3(3,0) Working knowledge of the underlying principles of the operation of lasers and their utilization in engineering systems is provided. The criterion for output power and wavelength are examined. The study of the characteristics of lasers that are pertinent to system design is stressed. *Preq:* E&CE (PHYS) 340, 341, PHYS 222 and 442.

438, 638 Computer Communications 3(3,0) Digital data transmission techniques, modems and communications channels, communications software and protocols, multiprocessors and distributed processing. Concurrency and cooperation of dispersed processors. *Preq:* Senior standing in Electrical or Computer Engineering or Computer Science or consent of instructor

439, 639 Fiber Optics 3(3,0) The underlying principles of design for optical fibers in practical systems is covered. Optical fiber as a waveguide is examined using wave optics and ray optics. Design criteria for using mono- and multimode fibers are discussed. Other topics include fabrication, measurement, packaging, and coupling of optical fibers. *Preq:* PHYS 222, E&CE (PHYS) 340, 341

440, 640 Performance Analysis of Local Computer Networks 3(3,0) Introduction to the design and performance analysis of local computer networks. Emphasis is placed on performance analysis of representative multiaccess procedures. Three common types of networks are considered in detail. *Preq:* E&CE 317 or MTHSC 400 and E&CE 250 or equivalent

441, 641 Theory of Sequential Machines 3(3,0) Introduction to the theory of computing covering the topics of sequential machines, sequential machine decomposition, formal language theory and Turing machines.

446, 646 Antennas and Propagation 3(3,0) Antenna design and utilization from the standpoint of transmission, reception and as a system component. Study of the theoretical and practical aspects of antenna design and utilization, input impedances, structural considerations and wave propagation. *Preq:* E&CE 330, 341, 436.

450, 650 Computer System Design Project 2(0,4) A project-oriented course which brings together computer engineering students into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Preq:* E&CE 321, 329, 330.

451, 651 System Design Project 2(0,4)F, S A project-oriented course which brings together electrical engineering students of dissimilar training into teams or project groups. Assignments are made to each group which are designed to help develop an appreciation for individual and creative thinking as well as team effort. *Coreq:* E&CE 302, 321, 330.

452, 652 Programming Systems 3(3,0)S A second course in programming languages and systems. Topics include assemblers, compilers and syntactical methods; string manipulation and list processing; concepts of executive programs and operating systems; introduction to time-sharing systems. *Preq:* E&CE 250; 352 is recommended.

454, 654 Physiological Control Systems 3(2,2) Control theory will be introduced to the level that frequency domain analysis and computer simulation using CSMP can be used. Emphasis will be placed on computer modeling of the pulmonary, renal, hormonal, and cardiovascular systems. *Preq:* Senior standing, consent of instructor.

458, 658 Circuit Design of Modern Analog Filters 3(3,0) Review of resistor op amp circuits, bilinear transfer functions, cascade design, biquadratic realizations, Butterworth and Chebyshev filters, sensitivity, frequency and network transformations, component and operational simulation of LC ladders, switched capacitor filters. *Preq:* E&CE 301, 330. *Coreq:* E&CE 302.

459, 659 Integrated Circuit Design 3(2,2) Design concepts and factors influencing the choice of technology. Fundamental MOS device design. Silicon foundaries, custom and semicustom integrated circuits. Computer-aided design software/hardware trends and future developments. Hands-on use of CAD tools to design standard library cells. Systems design considerations, testing, and packaging. *Preq:* E&CE 321.

460, 660 Computer-Aided Analysis and Design 3(3,0)F Principles and methods suited to the solution of engineering problems on the digital computer. Topics include widely used methods for the solution of the systems of algebraic and/or differential equations which arise in the modeling of engineering systems, data approximation and curve fitting, continuous system simulation languages, and design-oriented programming systems. *Preq:* E&CE 301 or consent of department head.

463, 663 Microcomputers 3(2,2) Single-chip microcomputers: hardware, software, interfacing. Systems design using currently available peripheral chips. Single-board computers. Detailed study of chip-slice microprocessors. Present and future trends in microcomputer hardware, software, and architecture. *Preq:* E&CE 425, 426.

467, 667 Introduction to Digital Signal Processing 3(3,0) Introduction to characteristics, design, and applications of discrete time systems. Design of digital filters. Introduction to the Fast Fourier Transform (FFT). LSI hardware for signal processing applications. *Preq:* E&CE 330.

468, 668 The Embedded Microprocessor 3(2,2) Interfacing, architecture, and design issues which arise when the microprocessor is embedded in electromechanical and human systems. Applications and design projects include guidance systems, robotics, process control, artificial limbs, etc. *Preq:* E&CE 330, 425.

471, 671 Microcomputer Applications in Medical Instrumentation 3(3,0) Study of state-of-the-art techniques of analysis and monitoring in clinical and research environments. Electrocardiographic (ECG) and electroencephalographic (EGG) analysis and monitoring will be discussed in detail. Automation of other clinical facilities such as intensive care and the catheterization laboratory will be considered. Microcomputer design considerations will be emphasized. *Preq:* E&CE 425 or equivalent microcomputer experience.

492, 692 Special Problems 1-3(0,2) Special assignment in electrical or computer engineering. Some typical assignments include computer programs, term papers, technical literature searches, hardware projects, and design project leadership. May be taken only once for credit.

493, 693 Selected Topics 1-3(1-3,0) Classroom study of current and new technical developments in electrical and computer engineering. *Preq:* Consent of instructor.

701 Master of Engineering Design Project 1-3

801 Analysis of Linear Systems 3(3,0)

802 Electric Motor Control 3(3,0)

803 Linear Control Theory and Design 3(3,0)

804 Methods of Applied Optimization and Optimum Control 3(3,0)

805 Methods of State and Parameter Estimation of Stochastic Systems 3(3,0)

806 Identification in Control 3(3,0)

807 Power System Analysis Techniques 3(3,0)

808 Self-Organizing Control 3(3,0)

809 Semiconductor Materials 3(3,0)

811 Integrated Circuit Design 3(3,0)

817 Power System Transients 3(3,0)

819 Detection and Estimation Theory 3(3,0)

820 Theory of Communications I 3(3,0)

821 Theory of Communications II 3(3,0)

822 Information Theory 3(3,0)

823 Integrated Circuit Technology 3(3,0)

825 Solid-State Electronics 3(3,0)

829 Quantum Electronics 3(3,0)

830 Electromagnetics 3(3,0)

831 Advanced Electromagnetic Theory 3(3,0)

832 Electromagnetic Measurements 3(3,0)

833 Integrated Optics and Beam Waveguides 3(3,0)

834 Asymtopic Methods and Diffraction Theory 3(3,0)

836 Microwave Circuits and Systems 3(3,0)

837 Advanced Antenna Theory 3(3,0)

838 Special Topics in Electromagnetics 1(1,0)

839 Integral Equations in Electromagnetics 3(3,0)

840 Physics of Semiconductor Devices 3(3,0)

841 Distributed Computing and Networks 3(3,0)

842 Computer Architecture 3(3,0)

843 Computer Graphics 3(3,0)

844 Digital Signal Processing 3(3,0)

845 Computer System Design and Operation 3(3,0)

846 Digital Processing of Speech Signals 3(3,0)

847 Digital Image Processing 3(3,0)

850 Computation and Simulation 3(3,0)

851 Advanced Topics in Computer Architecture 3(3,0)

852 Software Engineering 3(3,0)

853 Computer Data Displays 3(3,0)

855 Artificial Intelligence 3(3,0)

856 Pattern Recognition 3(3,0)

857 Coding Theory 3(3,0)

858 Automata Theory 3(3,0)

870 Biosystems Analysis 3(3,0)

890 Engineering Report Research Var. Credit

891 Master's Research. Credit to be arranged.

892 Special Problems in Electrical and Computer Engineering 1-3(1-3,0)

893 Selected Topics in Electrical and Computer Engineering 1-3(1-3,0)

991 Doctoral Research. Credit to be arranged.

ENGINEERING (ENGR)

100 Career Guidance Seminar 0(1,0) Orientation to the College of Engineering. Investigation of the professional fields of engineering and considerations in selecting an engineering career. Required of all engineering freshmen. *Preq:* Freshman standing.

110 Engineering Problems Workshop 1(0,2) Workshop devoted to the analysis and solution of engineering-oriented problems. Representative problems taken from the different fields of engineering will be used to illustrate such analytical and problem-solving techniques as estimation and approximation, numerical aids to computation, and solutions by graphical methods.

180 Engineering Concepts 3(2,2) Introduction to the profession of engineering. The engineering process, from problem formulation to the evolution of creative design, is demonstrated through the practical application of engineering problems. The utility and significance of computing devices in engineering practice are emphasized. Computer programming is introduced

220 Technology in the Modern World 3(3,0) Designed for technical and nontechnical students to give an appreciation of the two-way interaction between technology and society. Historical, present, and projected topics will be included from a variety of disciplines. *Preq:* Sophomore standing in any college.

250 Systems Internationale—The Modern Metric System 1(1,0) Public Law 94-168 proclaims that the United States is converting to the modern metric system. This course, taught for all University students, will present the fundamentals of SI metric and will discuss the impact of converting to SI on business, industry, education, and the consumer.

ENGINEERING GRAPHICS (EG)

Professor: W. E. Castro; *Associate Professors:* V. B. Anand, D. L. Ryan; *Assistant Professors:* N. M. Aziz, R. M. Bata; *Visiting Instructor:* J. C. James

105 Engineering Drawing 2(1,3) A course in engineering drawing using the following procedures and techniques: lettering, use of instruments, plats, traverses, contour plotting and mapping, profile sections, and chart drawing.

109 Engineering Graphics 2(1,3)[1] A course for the introduction of engineering graphics as a problem-solving tool. Areas of study include theory of orthographic points, lines, planes, and solids; sectional views; dimensioning; and design drawings.

208 Engineering Graphics with Computer Applications 3(2,3)[1] Course designed for the introduction of basic concepts in engineering graphics as a means of communication. Areas of study include theory of orthographic projections, descriptive geometry, and computer graphics. *Preq:* ENGR 180.

209 Introduction to Engineering/Computer Graphics 2(1,3)[1] Designed for the introduction of basic graphical concepts needed for engineering application, including orthographic projections, descriptive geometry, and computer graphics.

308 Computer-Aided Engineering Graphics 3(2,2) Continuation of EG 208 with emphasis on computer programming for graphics displays. *Preq:* EG 208 or consent of instructor.

411 Computer-Aided Process Planning—Graphics 3(3,0) This course introduces the student to the computer-aided processes used in the A&E office. It is designed to be compatible with current industrial practices, equipment, and procedures to produce construction drawings. *Preq:* Senior standing or consent of department head.

412, 612 Interactive Computer Graphics 3(3,0) Graphics hardware and display technology. Reduction and presentation of engineering data. Techniques of geometrical transformations, perspective and model manipulation. Methodology of computer-aided design. Application of higher-level software to engineering problems. *Preq:* EG 208 and MTHSC 208 or consent of instructor.

490, 690 Special Topics in Engineering Graphics 1-3(1-3,0) Comprehensive study of any computer-aided topic in engineering graphics not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chairman.

ENGINEERING MECHANICS (EM)

Professors: S. C. Anand, N. R. Bauld, Jr., R. H. Brown, W. E. Castro, R. E. Elling, J. G. Goree, E. H. Law, B. L. Sill; *Associate Professors:* J. E. Jackson, Jr., R. F. Nowack, P. R. Sparks; *Assistant Professor:* J. M. Kennedy

201, H201 Engineering Mechanics: Statics 3(3,0) Forces and force systems and their external effect on bodies, principally the condition of equilibrium. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Preq:* PHYS 122. *Coreq:* MTHSC 206.

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[1] Credit toward a degree will be given for only one of the following: EG 109, 208, 209.

202, H202 Engineering Mechanics: Dynamics 3(3,0) Continuation of EM 201. The principal topics are kinematics and kinetics of particles and rigid bodies of finite size. Techniques of vector mathematics are employed. *Preq:* EM 201, MTHSC 206.

304, H304 Mechanics of Materials 3(3,0) The relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. *Preq:* EM 201, MTHSC 206.

305 Mechanics of Materials Laboratory 1(0,3) Theoretical relationships considered in EM 304 are verified. Students observe the behavior under load and the failure of engineering materials; identify and evaluate mechanical properties of materials important to design and manufacturing processes; and are acquainted with various testing methods, testing machines, and instruments. *Preq:* Must be accompanied or preceded by EM 304.

320, H320 Fluid Mechanics 3(3,0) The behavior of fluids at rest or in motion, including the study of fluid properties. Emphasis is placed upon a rational, analytical approach from which are developed basic principles of broad applicability to all fields of engineering. *Preq:* EM 202.

322 Fluid Mechanics Laboratory 1(0,3) The principles developed in EM 320 are verified and demonstrated. Familiarization with orderly techniques in organizing and reporting results of experimental investigations and with the use of instruments and equipment is afforded. *Preq:* Must be accompanied or preceded by EM 320.

425, 625 Advanced Strength of Materials 3(3,0) Topics in strength of materials not covered in EM 304. Three-dimensional stress and strain transformations, theories of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. *Preq:* EM 304.

430, 630 Mechanics of Composite Materials 3(3,0) Fundamental relationships for predicting the mechanical and thermal response of multi-layered materials and structures are developed. Micromechanical and macromechanical relationships are developed for laminated materials with emphasis on continuous filament composites. The unique nature of composites and the advantages of designing with composites are discussed. *Preq:* EM 304.

450, 650 Mechanical Vibrations 3(3,0) Mathematical analysis of physical problems in the vibration of mechanical systems. Topics include linear-free vibrations, forced vibrations, and damping in single degree of freedom systems, transient vibrations, critical speeds and whirling of rotating shafts, dynamic balancing, and multidegree of freedom systems with lumped parameters. *Preq:* EM 202, 304, MTHSC 208.

470, 670 Experimental Stress Analysis 3(2,3) Experimental analysis of static and dynamic stress fields. Emphasis is on the techniques required to obtain data and the theoretical analysis required for proper interpretation. Methods and instrumentation associated with strain gages (including transducer applications), Moire grids, brittle coatings, photoelasticity, and photoelastic coatings are studied. *Preq:* EM 304 and consent of instructor.

829 Energy Methods and Variational Principles 3(3,0)

831 Theory of Elasticity I 3(3,0)

832 Theory of Elasticity II 3(3,0)

834 Principles of Structural Stability 3(3,0)

845 Intermediate Dynamics 3(3,0)

852 (CE) Advanced Finite Element Analysis 3(3,0)

891 Master's Research. Credit to be arranged.

893 Selected Topics in Engineering Mechanics 1-6(1-6,0)

991 Doctoral Research. Credit to be arranged.

ENGINEERING TECHNOLOGY (ET)

Professor: L. O. Drew; *Associate Professors:* R. J. Kopczyk, *Acting Head;* T. H. Oswald, C. K. Roby, E. L. Shepphard; *Adjunct Associate Professor:* W. J. Barnett; *Adjunct Assistant Professor:* W. H. Chasteen; *Adjunct Instructor:* L. B. Copeland

490 Selected Topics in Engineering Technology 1-3(1-3,0) Comprehensive study of any timely or special topic in engineering technology not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

ENGLISH (ENGL)

Professors: H. B. Bryant, R. J. Calhoun, C. L. Caskey, F. L. Day, J. L. Idol, Jr., G. W. Koon, *Head;* J. J. McLaughlin, R. W. Moran, R. B. Rollin, C. H. Sawyer, M. S. Steadman, Jr., R. A. Underwood; *Associate Professors:* R. E. Barfield, Jr., B. K. Duffy, C. S. Egan, S. K. Eisiminger, D. G. Goswami, L. L. Henry, J. L. Hodgin, J. B. McLaughlin, V. A. Rudowski, T. W. Russell III, R. C. Sawyer, F. W. Shilstone, D. C. Tillinghast, M. O. Usrey, E. P. Willey, M. R. Winchell, C. H. Woodell; *Assistant Professors:* D. G. Bzdyl, L. Carrillo, S. Duffy, D. N. Griffin, D. B. Haisty, S. J. Hilligoss, M. J. Jacobi, C. E. Johnston, N. Kochuk, J. B. Simms, E. K. Sparks, J. P. Stanton, C. M. Ward, J. P. Zanes; *Instructors:* A. B. Coleman, L. H. Dunlap, A. G. Dyar, L. D. Egan, H. C. Gaddy, L. D. Knowling, D. L. Latham, R. W. Leeman, A. A. Metzegen-Bundiy, K. L. Osborn, T. E. Rash, K. W. Roberts, M. B. Strickland, S. S. Titus, D. C. Tool, R. H. Woodward; *Visiting Associate Professor:* C. R. Lovitt; *Visiting Assistant Professors:* M. M. Duggan, R. A. Evans, Jr., D. L. Shealy; *Visiting Instructors:* R. L. Caldwell, A. E. Childress, J. L. DeHart, M. R. Dickman, C. E. Foster, A. J. Haubenreich, M. J. Hunter, J. P. Jacobi, A. M. Leblanc, C. M. Lee, J. A. Overton, P. C. Schleifer, J. W. Thompson, J. M. Turlington, M. K. Williams, M. R. Wininger; *Lecturer:* B. J. Ramirez

100 English Fundamentals 3(3,2) Drill in basic writing skills: mechanics, spelling, syntax, usage, dialect, sentence clusters, and paragraphing. Required of all freshmen who do not make a satisfactory score on the SAT verbal. Carries no credit for graduation.

101, H101 Composition I 3(3,0) Training in correct and effective expression, in brief expository essays; review of the fundamentals of grammar and punctuation; instruction in common expository methods.

102, H102 Composition II 3(3,0) Continued emphasis on correct and effective expression; training in the organization and writing of the research report. *Preq:* ENGL 101.

111 English As a Second Language 3(3,2) A special course for students learning English as a second language. Intensive study and drill in American English pronunciation and listening comprehension. Required of all foreign students who do not make a satisfactory grade on screening examinations in oral English. To be taken on a pass-fail basis only. Carries no credit for graduation.

170 Theatre Appreciation 1(0,3) Examination of theatre history, genres, and production practices through discussions, demonstrations, and field trips to live dramatic performances.

190 The Study of English 1(1,0) Orientation to the study of English language and literature and to the sources and methods of literary research. Required of all English majors and recommended for minors.

202 The Major Forms of Literature 3(3,0) Study of the basic structures and elements of fiction, poetry, and drama, including literary and critical theory, with readings in American, British, and world literature. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

203, H203 Survey of English Literature I 3(3,0) Chief British authors and works from *Beowulf* to the Romantic period. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

204, H204 Survey of English Literature II 3(3,0) Chief British authors and works from the Romantic period to 1945. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

205, H205 Survey of American Literature I 3(3,0) American literature to the Civil War, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

206, H206 Survey of American Literature II 3(3,0) American Literature from the Civil War to 1945, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

207 Survey of World Literature I 3(3,0) Translations of continental European literature from Homer to the Renaissance (together with some Asian classics), with emphasis on major authors. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

208 Survey of World Literature II 3(3,0) Translations of continental European literature from the seventeenth century to the present (together with some Asian classics), with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

209 Contemporary Literature 3(3,0) A study of selected writers since 1945, primarily British and American. Proficiency in composition must be demonstrated. *Preq:* ENGL 101, 102.

217 Vocabulary Building 3(3,0) Development of a useful discriminating vocabulary for writing, speaking, and reading. Student notebooks and proficiency quizzes. *Preq:* ENGL 101, 102.

231 Introduction to Journalism 3(3,0) Instruction and practice in writing for mass media; editorial responsibilities. *Preq:* ENGL 102.

260 Broadcasting Internship 1-3(0,2-6) Part- or full-time supervised work experience with a television or radio network, station, or related industry such as an advertising agency handling broadcasting clients. Offered on Pass/Fail basis only. *Preq:* Consent of instructor.

279 Theatre Laboratory 1(0,3) Practical work in theatre on a production designed for public presentation. May be repeated for a maximum of three credits. *Preq:* Sophomore standing.

300 Introduction to Linguistics 3(3,0) Introduction to general linguistic principles. A survey of the biological, structural, and social aspects of language. *Preq:* Sophomore literature.

301 Public Speaking 3(3,0) Practical instruction in public speaking; practice in the preparation, delivery, and criticism of short speeches. *Preq:* Junior standing.

304 Business Writing 3(3,0) An introduction to business writing: memoranda, letters, reports, and research methods. *Preq:* Junior standing.

312 Advanced Expository Writing 3(3,0) A workshop in practical writing focusing on principles and style. *Preq:* Sophomore literature or consent of instructor

314 Technical Writing 3(3,0) Intensive training in the fundamentals of technical writing: reports, letters, and memoranda. *Preq:* Junior standing.

316 Writing and International Trade 3(3,0) Students will complete projects demanding a variety of communications skills that professionals in International Trade need; sensitivity to foreign audiences and cultures in oral and written communication, electronic and graphic communication, collaborative writing and management. *Preq:* Sophomore literature.

331 Publications Workshop 1(1,0) Workshop designed for students who serve on student publication staffs. This course emphasizes the responsibilities of staff members. May be repeated for a maximum of three credits. *Preq:* ENGL 102 and consent of the instructor.

333 Reporting for the News Media 3(3,0) Practical experience in gathering and writing news and feature copy for the media, concentration on print journalism; examination of the role of the modern journalist; laws governing the profession, journalistic ethics. *Preq:* ENGL 231 or consent of instructor.

334 Feature Writing 3(3,0) Practical experience in writing feature articles for newspapers, magazines, and free-lance markets. *Preq:* ENGL 231 or consent of instructor.

335 Editing for Newspapers 3(3,0) An examination of the editing process at newspapers and magazines. Practical experience in article selection, copy-editing, headline and blurb writing, and page design. *Preq:* ENGL 231 or consent of instructor.

345 The Structure of Fiction 3(3,0) An introduction to the creative writing and critical study of prose fiction. *Preq:* Sophomore literature or consent of instructor.

346 The Structure of Poetry 3(3,0) An introduction to the creative writing and critical study of poetry. *Preq:* Sophomore literature or consent of instructor.

347 The Structure of Drama 3(3,0) Introduction to the creative writing and critical study of drama. *Preq:* Sophomore literature or consent of instructor.

350 Mythology 3(3,0) A study of the great myths of the world with an emphasis on their applications to literature. *Preq:* Sophomore literature or consent of instructor.

351 American Folklore 3(3,0) A study of American folklore with an emphasis on such considerations as the folktale, folk songs and ballads, folk heroes, and folk superstitions and remedies. *Preq:* Sophomore literature or consent of instructor.

353 Ethnic American Literature 3(3,0) A critical examination of essays, poetry, fiction, and drama written by members of a variety of American racial and ethnic groups, such as Native Americans, Afro-Americans, Chicano-Mexicans, Asian Americans, Italian Americans, and American Jews. *Preq:* Sophomore literature or consent of instructor.

355 Popular Culture 3(3,0) An examination of the nature, functions, history, and impact upon American society of best sellers, popular magazines, television, movies, and other like phenomena. *Preq:* Sophomore literature or consent of instructor.

356 Science Fiction 3(3,0) Readings in science fiction from the seventeenth century to the present, with special emphasis on writers since Verne and Wells. *Preq:* Sophomore literature or consent of instructor.

357 Film 3(3,0) An examination of the film medium as an art form: its history, how films are made, why certain types of films (western, horror movies, and so forth) have become popular, and how critical theories provide standards for judging film. *Preq:* Sophomore literature or consent of instructor.

358 Advanced Studies in Film 3(2,3) Continued study of film theory and aesthetics, with applications of that knowledge to the making of a film. *Preq:* ENGL 357 or consent of instructor.

359 Special Topics in Language, Literature, or Culture 3(3,0) Studies in varied topics not central to other English courses, such as Literature and Art/Business/Sports; Language and Style; Black Literature. Specific titles and course descriptions to be announced from semester to semester. May be repeated once with department head's consent. *Preq:* Sophomore literature or consent of instructor.

360 Persuasion 3(3,0) Theories of persuasion and propaganda; practical instruction in the composition of persuasive speeches. *Preq:* Sophomore literature or consent of instructor.

361 Argumentation and Debate 3(3,0) The basic principles of argumentation with emphasis on developing practical skills in argumentative speech. The role of the advocate in contemporary society and an analysis of selected significant debates in U.S. history. *Preq:* Sophomore literature or consent of instructor.

362 Forensic Laboratory 1(0,3) Organized preparation for participation in college speech activities, intercollegiate, campus, and community programs. May be repeated for a maximum of 3 credits. *Preq:* Sophomore literature or consent of instructor.

363 Oral Interpretation of Literature 3(3,0) Analysis and oral interpretation of selected poetry and prose; training in development of effective tone production. *Preq:* Sophomore literature or consent of instructor.

364 Organizational Communication 3(3,0) Theories and techniques of communications within small groups and other organized bodies. *Preq:* Sophomore literature or consent of instructor.

365 Broadcasting: History and Criticism 3(3,0) A critical examination of the history and issues of broadcasting in America. *Preq:* Sophomore literature or consent of instructor.

366 Special Topics in Speech 3(3,0) Consideration of select major areas of study in speech. *Preq:* Sophomore literature or consent of instructor.

368 Voice and Diction 3(3,0) Practical training in speech, with emphasis on clarity, vocal variety, and tone quality. *Preq:* Sophomore literature or consent of instructor.

369 Modern American Political Rhetoric 3(3,0) An examination of American political rhetoric after 1900, focusing on such notable speakers as Franklin D. Roosevelt, John F. Kennedy, and Martin Luther King, Jr. *Preq:* Sophomore literature or consent of instructor.

375 Beginning Acting 3(2,3) The fundamentals of acting; basic stage techniques; exercises in interpretation, improvisation, characterization; experience in supervised performance. *Preq:* Sophomore literature or consent of instructor.

376 Principles of Stage Direction 3(2,3) Directing and staging techniques for the proscenium stage; exercises in composition, movement, picturization; experience in direction of scenes. *Preq:* Sophomore literature or consent of instructor.

377 Stagecraft 3(2,3) Theory and practice of stage design and technology. *Preq:* Sophomore literature or consent of instructor

378 Historical Survey of the Theatre 3(3,0) Study of the changing roles of the playwright, director, actor, technician, and spectator in the Western theatre. *Preq:* Sophomore literature or consent of instructor.

385 Children's Literature 3(3,0) Wide reading in prose and verse suitable for children in elementary grades. *Preq:* Sophomore literature.

386 Adolescent Literature 3(3,0) Wide reading in prose and verse suitable for children in secondary schools. *Preq:* Sophomore literature.

392 Technical Editing 3(3,0) Practical experience in editing and preparing technical manuscripts for publication. General introduction to the functions of the technical editor. *Preq:* ENGL 304, 314, or consent of instructor

400, 600 The English Language 3(3,0) Studies in English usage and the historical development of the language. *Preq:* Sophomore literature.

401, 601 Grammar Survey 3(3,0) Survey of modern grammars with a focus on exploring the impact structural grammar has had on traditional grammar Recommended for English teachers. *Preq:* Sophomore literature.

402, 602 Syntax 3(3,0) Introduction to transformational grammar with a focus on syntax. *Preq:* ENGL 300 or consent of instructor.

403, 603 The Classics in Translation 3(3,0) An examination of Homer's *Iliad* and *Odyssey*, Virgil's *Aeneid*, and Ovid's *Metamorphoses*. A few shorter works by other Greek and Roman writers may also be read. *Preq:* Sophomore literature.

404, 604 Classical Drama 3(3,0) Selected reading in the dramatic literature of classical Greece and Rome. *Preq:* Sophomore literature.

405, 605 Studies in English Literature to 1700 3(3,0) Selected readings in English literature from the beginnings to 1700, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore literature.

406, 606 Studies in English Literature Since 1700 3(3,0) Selected readings in English literature from 1700 to the present, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore literature.

407, 607 The Medieval Period 3(3,0) Selected works of Old and Middle English literature, exclusive of Chaucer *Preq:* Sophomore literature.

408, 608 Chaucer 3(3,0) Selected readings in Middle English from *The Canterbury Tales* and other works by Chaucer. *Preq:* Sophomore literature.

409, 609 The Earlier English Renaissance 3(3,0) Tudor and Elizabethan poetry, prose, fiction, translations, essays, and criticism. *Preq:* Sophomore literature.

410, 610 Drama of English Renaissance 3(3,0) Selected readings in non-Shakespearean dramatic literature of the 16th and 17th centuries. *Preq:* Sophomore literature.

411, 611 Shakespeare 3(3,0) A study of selected tragedies, comedies, and history plays of Shakespeare. Required of all English majors. *Preq:* Sophomore literature.

412, 612 Studies in Shakespeare 3(3,0) Special topics in Shakespeare as selected by instructors. May be repeated once with department head's consent. *Preq:* Sophomore literature.

413, 613 Later English Renaissance 3(3,0) Nondramatic poetry and prose from Ben Jonson, John Donne, and Francis Bacon through Andrew Marvell and John Bunyan, excluding Shakespeare and Milton. *Preq:* Sophomore literature.

414, 614 Milton 3(3,0) The development of Milton's art and thought from the minor poems and selected prose through *Paradise Lost, Paradise Regained,* and *Samson Agonistes,* set against the background of the late Renaissance. *Preq:* Sophomore literature.

415, 615 The Restoration and Eighteenth Century 3(3,0) Readings in Dryden, Swift, Pope and Dr. Johnson. *Preq:* Sophomore literature.

416, 616 The Romantic Period 3(3,0) Readings from the poetry and critical prose of Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and other representative figures. *Preq:* Sophomore literature.

417, 617 The Victorian Period 3(3,0) Reading from the poetry and nonfiction prose of selected Victorian authors, including works of Carlyle, Tennyson, Browning, Arnold, and other representative figures. *Preq:* Sophomore literature.

418, 618 The English Novel 3(3,0) Study of the English novel from its 18th century beginnings through the Victorian Period. *Preq:* Sophomore literature.

422, 622 American Literature I 3(3,0) Major American authors and movements from the Colonial period to the Civil War. *Preq:* Sophomore literature.

423, 623 American Literature II 3(3,0) Major American authors and movements from the Civil War to the early 20th century. *Preq:* Sophomore literature.

424, 624 American Literature III 3(3,0) Major American authors and movements of the 20th century. *Preq:* Sophomore literature.

425, 625 The American Novel 3(3,0) A survey of the most significant forms and themes of the American novel from its beginnings to 1900. *Preq:* Sophomore literature.

426, 626 Southern Literature 3(3,0) The intellectual and literary achievement of the South from 1607 to the present, with emphasis upon the writers of the 19th century. *Preq:* Sophomore literature.

430, 630 Modern Drama 3(3,0) Principles and progress of drama from Ibsen to the present; analysis of representative plays; critical reports; discussion of trends in contemporary drama. *Preq:* Sophomore literature.

431, 631 Modern Poetry 3(3,0) The modern tradition in English and American poetry from Yeats to the present; relevant critical essays. *Preq:* Sophomore literature.

432, 632 Modern Fiction 3(3,0) American and British novels and short stories of the 20th century. *Preq:* Sophomore literature.

435, 635 Literary Criticism 3(3,0) Major critical approaches to literature. *Preq:* Sophomore literature.

437, 637 Directed Studies 1-3(1-3,0) Class and tutorial work for students with special interests or projects in American, British, or European literature outside the scope of existing courses. Application(s) must be approved during the preregistration period of the semester preceding the one in which directed studies will occur. May be repeated by arrangement with the department. *Preq:* Junior standing and approved preregistration.

H438 Senior Division Honors Research 3(3,0) Research for the preparation of an honors project. *Preq:* Senior standing, and approval of the Department of English and the University Honors Program Committee.

H439 Senior Division Honors Project 3(3,0) Preparation of an honors project. *Preq:* ENGL H438 and senior standing.

445, 645 Fiction Workshop 3(3,0) A workshop in the creative writing of prose fiction. May be repeated one time for credit. *Preq:* ENGL 345 or consent of instructor.

446, 646 Poetry Workshop 3(3,0) A workshop in the creative writing of poetry. May be repeated one time for credit. *Preq:* ENGL 346 or consent of instructor.

447, 647 Playwriting Workshop 3(0,3) A workshop in the creative writing of plays. May be repeated one time for credit. *Preq:* ENGL 347 or consent of instructor.

455, 655 American Humor 3(3,0) Native American humor of the 19th and 20th centuries. *Preq:* Sophomore literature.

459 Advanced Special Topics in Language, Literature, or Culture 3(3,0) Advanced studies in topics not central to other English courses, such as certain authors, works, genres, themes, or areas of knowledge and culture. Specific topics will be announced when offered. May be repeated once for credit with department head's consent. *Preq:* Sophomore literature.

475 Intermediate Acting 3(2,3) The study and practice of acting styles and techniques, including those for period plays, musicals, and nonproscenium contemporary forms. *Preq:* ENGL 375 or consent of instructor.

476 Advanced Stage Direction 3(2,3) Study of production practices, problems, and techniques of style and composition, including those for period plays, musicals, and plays presented in nonproscenium staging areas. *Preq:* ENGL 376 or consent of instructor.

477 Stage Design 3(2,3) Study and practice in stage design, including drafting, graphics, drawing, rendering, scene painting, and light plotting. *Preq:* ENGL 377 or consent of instructor.

485, 685 Composition for Teachers 3(3,0) Practical training in teaching composition: finding workable topics, organizing and developing observations and ideas, evaluating themes, and creative writing. *Preq:* Sophomore literature.

490, 690 Advanced Technical and Business Writing 3(3,0) Advanced work in writing proposals, manuals, reports, and publishable articles. Students will produce work individually and in groups. *Preq:* ENGL 304 or 314 or consent of instructor.

491, 691 Classical Rhetoric 3(3,0) Study of the major texts in classical rhetoric. This course examines the nature and functions of rhetoric in Greek and Roman societies. It traces the development of rhetoric from Protagoras through Isocrates, Plato, Aristotle, Cicero, and Quintillian, and considers questions essential to understanding persuasive theory and practices. *Preq:* Sophomore literature or consent of instructor.

492, 692 Modern Rhetoric 3(3,0) Examines the "new rhetorics" of the 20th century, which are grounded in classical rhetoric but which include findings from biology, psychology, linguistics, and anthropology, among other disciplines. It considers the theories and applications of communication. *Preq:* Sophomore literature or consent of instructor.

700 Children's Literature for Teachers 3(3,0)

701 Literature for Teachers 3(3,0)

800 Introduction to Research 1(1,0)

801 Topics in Composition and Rhetoric 3(3,0)

802 Topics in Literary Genres 3(3,0)

805 Topics in Medieval Literature 3(3,0)

808 Topics in Renaissance and Restoration Literature 3(3,0)

811 Topics in Neoclassical and Romantic Literature 3(3,0)

814 Topics in Victorian and Modern British Literature 3(3,0)

820 Topics in American Literature to 1865 3(3,0)

823 Topics in American Literature Since 1865 3(3,0)

831 Special Topics 3(3,0)

832 Topics in Scientific, Technical, and Business Writing 3(3,0)

835 Topics in Literary Criticism 3(3,0)

837 Topics in Linguistics 3(3,0)

840 Directed Studies 3(3,0)

891 Master's Research. Credit to be arranged.

ENTOMOLOGY (ENT)

Professors: G. R. Carner, S. B. Hays, *Head;* J. C. Morse, R. Noblet, T. E. Skelton; *Associate Professors:* D. R. Alverson, T. M. Brown; *Assistant Professors:* P. H. Adler, J. D. Culin, M. R. Strand, P. A. Zungoli

200 Insects 2(2,0) Introduction to insects; their various relationships with man, other animals and plants. The general nature of this course makes it beneficial to all students regardless of specialty. Closed to students who have had ENT 301 or equivalent.

301 General Entomology 3(2,3) A general introduction to entomology with emphasis on anatomy, metamorphosis, and description of the most common insect species. Methods of control are introduced and current control practices are explained for some of the more important species.

308 Apiculture 3(2,3) A detailed study of the honey bee and its economic importance in pollination and honey production. Attention will be given to bee behavior, colony management, equipment, honey plant identification, and honey production and processing. *Preq:* BIOL 104, 106, and consent of instructor.

401, H401, 601 Insect Pests of Ornamental Plants and Shade Trees 3(2,3) Recognition, biology, damage and control of insect pests of woody and other ornamental plants and shade trees. *Preq:* ENT 301.

402, H402, 602 Fruit, Nut, and Vegetable Insects 3(2,3) Common insect pests of the following are studied: peaches, apples, grapes, pecans, sweet corn, cole crops, cucurbits, potatoes, sweet potatoes, peas, and beans. Primary emphasis is placed on life histories, identification of destructive forms, recognition of damage, and current control measures. *Preq:* ENT 301.

403, H403, 603 Field Crop Entomology 3(2,3) Recognition, life histories, damage and control of economically important insect pests of major field crops, with an introduction to principles and practices of crop protection, including pesticide application, economic basis for making treatment decisions, and development of scouting programs. *Preq:* ENT 301.

404, H404, 604 Urban Entomology 3(2,3) Study of pests common to the urban environment with emphasis on biology, damage, control, and identification of household, structural, stored products, and food pests. Students will learn both theoretical and practical aspects of urban pest management and the pest-control industry. *Preq:* ENT 301.

405, H405, 605 Insect Morphology 4(3,3) A study of insect structure in relation to function and of the variation of form in insects. *Preq:* ENT 301.

410, 610 Insect Taxonomy 3(1,6) The identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification; lecture material deals with necessary theoretical discussion of taxonomic features observed in the laboratory. *Preq:* ENT 405 or consent of instructor.

412, 612 Field and Museum Entomology 3(0,9) Practical aspects of gathering, sorting, and curating insects. Students participate in intensive overnight insect-collecting expeditions to various parts of the Southeastern United States, becoming acquainted with insect habitats and collecting methods. The remainder of the summer session will be devoted to training in specimen preparation and preservation. *Preq:* Consent of instructor.

420, 620 Toxicology of Insecticides 3(2,3) Concepts of insecticide toxicology; principles of insecticide action; toxicological and pharmacological effects in insects and higher animals, safety, current regulations governing the use of insecticides. *Preq:* ENT 301.

430, 630 (SH) Toxicology 3(3,0) Basic principles of toxicology including quantitation of toxicity, toxicokinetics, biochemical action of poisons, and environmental toxicology are studied. Acute and chronic effects of various classes of poisons (e.g., pesticides, drugs, metals, and industrial pollutants) are discussed in relation to typical routes of exposure and regulatory testing methods. *Preq:* Organic chemistry, one year of general biology, or consent of instructor.

440, 640 Insect Behavior 3(2,3) Fundamentals of insect behavior in an evolutionary and ecological perspective. Laboratories emphasize generation and testing of hypotheses and observation, description, and quantification of insect behavior. *Preq:* ENT 301 or consent of instructor.

455, H455, 655 Medical and Veterinary Entomology 3(2,3) Insects and their arthropod relatives which are of economic importance in their effect on man and animals. *Preq:* ENT 301 or consent of instructor.

461 Directed Research in Entomology and Economic Zoology 1-3(0,3-9) Research problems in selected entomological and economic zoology areas to provide the student with experience in planning and conducting research, and presentation of research results. May be repeated for a maximum of three credits. *Preq:* Consent of instructor.

462 Seminar 1(1,0) Literary search and oral presentation of current entomological topics.

468, 668 Research Techniques 2(2,0) Conceptual and practical development of research projects in certain fields of biological and agriculture research. Experiment, and presentation of results in written and oral formats. Library and computer usage is strongly emphasized.

469, H469, 669 (WFB) Aquatic Insects 3(1,6) Identification, life history, habitats, and interrelationships of aquatic insects; techniques of qualitative field collecting; important literature and research workers. *Preq:* ENT 301 or consent of instructor

470, H470, 670 Insect Physiology 3(2,3) An introduction to the physiological systems of insects including structure as related to function. Emphasis will be on digestion, nutrition, reproduction, respiration, excretion, and nervous and hormonal systems as they affect growth and development in insects. *Preq:* ENT 301 or consent of instructor

480, H480, 680 Insect Pathology 3(2,3) Study of insect diseases including those caused by viruses, rickettsiae, bacteria, fungi, protozoa, and nematodes will be covered in this course. The effects of diseases on insect populations and the use of pathogens in insect control will also be considered in detail. *Preq:* ENT 301 or consent of instructor.

490 Practicum 1-4 Supervised entomological learning opportunity, providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written report midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Junior standing and consent of instructor.

808 Taxonomy of Immature Insects 3(1,6)

809 Seminar in Entomology 1(1,0)

810 Special Topics in Entomology 1-4(1-4,0)

812 Entomological History and Literature 1(1,0)

840 Insect Ecology 3(2,3)

853 Applied Systematics 3(2,3)

856 Medical Entomology 3(2,3)

860 Insect Pest Management 3(3,0)

861 Insect Toxicology 3(2,3)

863 Special Problems in Entomology 1-3(0,3-9)

870 Advanced Insect Physiology 3(2,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

ENVIRONMENTAL SCIENCE (ENSC)

Professors: A. R. Abernathy, R. F. Borgman, R. O. Hegg, W. P. Williams, Jr.

431, 631 Public Health Administration 3(3,0) A course designed to prepare one for a career in the environmental sciences, with positions in public health and pollution control. Topics included are public health organizations and regulations, public relations, psychology of public health administration, and the use of the communications media in educating the public on health problems.

432 Inspection Methods in Water and Solid Waste 3(2,3) Methods of disposal of liquid and solid wastes will be emphasized in regard to environmental quality control. Treatment plant methods will be discussed. Inspection techniques for adequate treatment is a basic approach.

471, 671 Man and His Environment 2(2,0) The interaction of man with his environment will be surveyed. Factors such as urbanization, population growth, pathogens, disease vectors, ionizing radiation, sewage disposal, and noise control will be considered. The effects of environmental contacts with air, water, food, and solid and liquid wastes will be emphasized. *Preq:* Consent of instructor.

472, 672 Environmental Planning and Control 2(2,0) Application of planning and control to effective environmental quality improvement. Water supply and treatment, wastewater treatment and disposal, solid waste disposal, air pollution abatement, and land use and zoning will be considered from the standpoint of control. Not intended for graduate students in engineering. *Preq:* Consent of instructor.

ENVIRONMENTAL SYSTEMS ENGINEERING (ESE)

Professors: A. R. Abernathy, B. C. Dysart III, C. P. Grady, Jr., J. C. Jennett, T. M. Keinath, *Head;* T. J. Overcamp, L. G. Rich, R. K. White; *Associate Professors:* A. W. Elzerman, R. A. Fjeld; *Adjunct Professors:* N. C. Elphick, A. W. Garrison, C. M. King, G. M. Mills

401, 601 Environmental Engineering 3(3,0) An introduction to the field of environmental engineering. Topics include environmental phenomena, impact of pollutants in the aquatic environment, solid-waste management, air pollution control, radiological health, and simple water and wastewater treatment systems. *Preq:* Junior standing in engineering or consent of instructor.

402, 602 Water and Waste-Treatment Systems 3(3,0) A study of the fundamental principles, rational design considerations, and operational procedures of the unit operations and processes employed in water and waste treatment. Both physiochemical and biological treatment techniques will be discussed. An introduction to the integration of unit operations and processes into water and waste treatment systems. *Preq:* EM 320 or consent of instructor.

410, 610 Environmental Radiation Protection I 3(3,0) Fundamental principles of radiological health and radiation safety. Topics include radiation fundamentals, basic concepts of environmental radiation protection, internal and external dosimetry, environmental-dose calculations and radiation protection standards. *Preq:* Consent of instructor.

411, 611 Environmental Radiation Protection Laboratory I 1(0,3) Experimental methods in environmental radiation protection. Topics include nuclear electronics, nuclear counting statistics; and radiation detection, interactions, and protection instrumentation. *Preq:* Consent of instructor.

430, 630 Air Pollution Engineering 3(3,0) Introductory course in air pollution and its control. Topics include air pollutants and effects, sources, dispersion models, engineering controls, and air quality legislation. *Preq:* Senior standing in engineering or physical sciences.

451, H451, 651 (AGE, FOR) Newman Seminar in Engineering 1(0,2) See AGE 451.

470, 670 Water Resources Engineering 3(3,0) Covers range of water resources development with emphasis on engineering aspects of traditionally important purposes of flood control, navigation, hydroelectric power, and reclamation. Stresses comprehensive, multiple purpose, and systems aspects of modern water resources development and management. Includes introduction to use of mathematical modeling and digital simulation in water resources planning and project design.

482, 682 (CE) Groundwater and Contaminant Transport 3(3,0) Basic principles of groundwater hydrology and transport of contaminants in groundwater systems; groundwater system characteristics; steady and transient flow; well hydraulics, design, and testing; contaminant sources, movement and transformations. *Preq:* EM 320. *Coreq:* ESE 401.

485, 685 Hazardous Waste Management 3(3,0) Introduction to the problems, regulations, treatment, and ultimate disposal of hazardous and toxic materials. Spill cleanup, groundwater transport, land disposal, incineration and treatment technologies are discussed. *Preq:* Senior standing in engineering or sciences.

491 Selected Topics in Environmental Engineering 1-3 A study of the dynamic role of environmental engineering in maintaining environmental quality. A comprehensive study of any phase of environmental engineering. *Preq:* Consent of department head.

701 Special Problems 1-6(1-6,0)

802 Environmental Engineering Principles 3(3,0)

803 Physicochemical Operations in Water and Wastewater Treatment Systems 4(4,0)

804 Biochemical Operations in Wastewater Treatment Systems 3(3,0)

805 Laboratory in Water and Wastewater Treatment Operations 2(0,6)

806 Integrated Design of Water and Wastewater Treatment Systems 4(4,0)

809 Industrial Wastewater Treatment 3(3,0)

812 Environmental Nuclear Engineering 3(3,0)

813 Environmental Radiation Protection Laboratory II 1(0,3)

831 Air Quality Monitoring 3(2,3)

832 Air Pollution Meteorology 3(3,0)

833 Air Pollution Control Systems 3(3,0)

843 Environmental Engineering Chemistry 3(3,0)

844 Environmental Engineering Chemistry Laboratory 2(1,3)

847 Advanced Topics in Environmental Engineering Chemistry 3(3,0)

849 Environmental Engineering Chemistry Laboratory 2(0,6)

850 Stream and Estuarine Analysis 3(3,0)

851 Biological Principles of Environmental Engineering 3(3,0)

852 Ecological Models 3(2,3)

856 Pollution of the Aquatic Environment 3(3,0)

857 Pollution of the Aquatic Environment Laboratory 1(0,3)

861 Environmental Systems Engineering Seminar 0-1(1,0)

862 Environmental Quality Case Study 1(0,3)

875 Water Resources Planning 3(3,0)

876 Water Resources Systems 3(3,0)

880 Environmental Risk Assessment 3(3,0)

881 Special Problems 1-4

883 Selected Topics in Environmental Engineering 1-4

884 Selected Topics in Environmental Engineering 1-4

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

EXPERIMENTAL STATISTICS (EXST)

Professors: P. M. Burrows, W. P. Byrd, L. W. Grimes, J. S. Lytle; *Associate Professor:* H. S. Hill, Jr.; *Assistant Professor:* W. C. Bridges, Jr.; *Instructor:* J. E. Toler

301 Introductory Statistics 3(2,2)F, S Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression and correlation. The role of statistics in interpreting research, and the general application of the methods are stressed.

462, 662 Statistics Applied to Economics 3(3,0)F Continuation of EXST 301 with emphasis on statistical methods used in the collection, analysis, presentation and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers and the designing of samples for surveys in the social science fields. *Preq:* EXST 301.

801 Statistical Methods 4(3,3)

803 Regression and Least Squares Analysis 3(3,0)

804 Sampling 3(3,0)

805 Design and Analysis of Experiments 3(3,0)

811 Special Problems in Experimental Statistics 1-3(0,2-6)

812 Special Topics in Experimental Statistics 1-3(1-3,0)

FINANCE (FIN)

Professor: R. H. Mabry, *Head; Associate Professors:* W. A. Kelly, Jr., R. H. Klein, R. B. McElreath, Jr., G. S. Sirmans, B. P. Woodside III; *Assistant Professors:* E. J. Ferreira, J. M. Harris, Jr., J. H. Mulherin III

101 (ACCT) Accounting and Finance Orientation 1(1,0) See ACCT 101.

210 Introduction to Investments 3(3,0) Examination of the basics of various investment alternatives. Course is aimed toward the nonbusiness major. Credit may not be received for both FIN 210 and FIN (ECON) 305.

304 (ECON) Risk and Insurance 3(3,0) Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints. Topics include probability, theory of the firm under uncertainity, insurance carriers and contracts, underwriting, and regulation. *Preq:* ECON 200, 211, or consent of instructor.

305 (ECON) Investment Analysis 3(3,0) A study of techniques useful in analyzing alternative investment opportunities with emphasis on corporate securities. Investment planning and portfolio management are considered. *Preq:* FIN 306 or 311 or consent of instructor.

306 Corporation Finance 3(3,0) Introduction to financial management of nonfinancial firms. Includes such topics as analysis of financial statements, financial forecasting, capital budgeting, working capital management, and long-term financing decisions. Credit may not be received for both FIN 306 and 311. *Preq:* ACCT 200 or 202 or 203; or consent of instructor.

307 Principles of Real Estate 3(3,0) A course to acquaint the student with the theories, practices, and principles which govern real estate markets. Major emphasis will be placed on three areas: (1) specifics of real estate brokerage, property rights and ownership; (2) making real estate investment decisions; and (3) financing real estate investments. *Preq:* FIN 306, or 311 or consent of instructor.

308 Financial Institutions and Markets 3(3,0) A study of financial institutions and markets with emphasis upon the role of financing American industry. *Preq:* ECON 302, FIN 306 or 311.

311 Financial Management I 3(3,0) First of a two-course sequence designed to provide indepth exposure to the theory and practice of corporate financial management and to demonstrate how financial management techniques are applied in decision-making. Credit cannot be received for both FIN 306 and 311. *Preq:* ACCT 202 and MTHSC 203 or 301.

312 Financial Management II 3(3,0) Continuation of the two-course sequence that begins with FIN 311. *Preq:* FIN 311 or 306 with approval of a Finance Department adviser.

402, 602 Asset Management 3(3,0) A study of the decision process and analytical techniques used in evaluating corporate investment decisions, including both long-term capital investments and working capital management. Computer-based financial decision making will be used. *Preq:* FIN 312 or consent of instructor.

404 Management of the Corporate Capital Structure 3(3,0) Financial policy, theory, and cases dealing with the use of debt financing, dividend policy, convertible securities, mergers and acquisitions, leasing, and special topics. *Preq:* FIN 312 or consent of instructor.

405, 605 Portfolio Management and Theory 3(3,0) Introduction to portfolio management. Includes the underlying theory, managing the equity and the fixed-income portfolios, portfolio evaluation, option-pricing theory, future markets and instruments. *Preq:* FIN (ECON) 305 and either FIN 306 or 311; or consent of instructor.

406, 606 Stock Options and Futures Markets 3(3,0) Consideration of the option pricing theory and strategy techniques most commonly used in the market for options. An overview of the futures markets is also considered. Special emphasis given to interest-rate futures, stock-index futures, and foreign-exchange futures. *Preq:* FIN (ECON) 305 or consent of instructor.

407, 607 Real Estate Investment and Finance 3(3,0) Emphasizes the fundamentals and techniques of economic and financial analysis in real estate investing. Also emphasizes the principles of mortgage credit and current financing methods in real estate transactions. *Preq:* FIN 307

408 Management of Financial Institutions 3(3,0) Detailed study of the operational, marketing, and regulatory aspects of the management of depository financial institutions. Emphasis will be placed on decision making through the extensive use of cases. *Preq:* FIN 308.

410, H410, 610 Research in Finance 1-3 Directed research course for students interested in a career in finance. Research topic selected by student and approved by instructor. A formal research paper is required. *Preq:* FIN 306 or 312 and consent of instructor.

411 International Financial Management 3(3,0) Study of the factors that affect the company's financial management decision framework in an international environment. Special attention is given to theory and practice of managerial finance in multinational firms. *Preq:* FIN 306 or 311.

807 (CF) Financial Management 3(3,0)

830 Advanced Financial Management 3(3,0)

FOOD SCIENCE (FDSC)

Professors: J. C. Acton, C. V. Morr, H. J. Raphael, W. P. Williams, Jr., *Head; Associate Professors:* J. A. Collins, D. H. Johns, M. E. Kunkel; *Assistant Professors:* S. F. Barefoot, I. Y. Han, J. C. Hoskin, R. L. Thomas, E. C. Turner

101 Epochs in Man's Struggle for Food 1(1,0) A study of significant developments in food preservation methods and the impact each had on man's struggle for food.

201 Man and His Food 2(2,0) A study of food and food products with emphasis on nutrients, nutrient needs, and the relationship between nutrient intake and health. Also discussed are food additives, nutritional awareness (to include nutrition labeling), product development, food protection, food resources, and the influence of processing on nutritional quality of food.

202 Introduction to Packaging 2(2,0) An introduction to the technological concepts involved in creating a package and its basic functions. Closure and sealing materials and methods, packaging and labeling laws, ecological impacts, and future of packaging are identified.

212 Man's Food Resources 2(2,0) Food material resources with reference to quality preservation, processing, and nutritional requirements. The role of science and technology in the modern food industry is emphasized. The need for food standards and grades is explained, and the functions of regulatory agencies are discussed.

305, H305 Dairy and Food Engineering 3(2,3) A study of the basic engineering principles and their application to the dairy and food processing operations. The relationship between engineering principles and fundamentals of food processing is emphasized. Topics include material and energy balance, electricity, steam, refrigeration, heat transfer, fluid mechanics, evaporation, water and waste treatment.

306 Food Service Operations 3(3,0) Principles of management of resources in commercial foodservice systems. Emphasis will be on types of delivery systems, principles of quantity food production, techniques for cost control and concepts of food science and food safety. *Preq:* FDSC 201 and Junior standing or consent of instructor.

401, H401, 601 Food Chemistry I 4(3,3) The basic composition, structure, and properties of food and the chemistry of changes occurring during processing utilization. *Preq:* BIOCH 210 or consent of instructor.

402, H402, 602 Food Chemistry II 4(3,3) Application of theory and procedures for quantitative and qualitative analysis of food ingredients and food products. Methods for protein, moisture, lipid, carbohydrate, ash, fiber, rancidity, color and vitamin analyses and tests for functional properties of ingredients are examined. *Preq:* BIOCH 210 or consent of instructor.

403, 603 Food Preservation and Processing I 3(3,0) Food preservation and processing by refrigerated and frozen storage, thermal processing and pasteurization, dehydration and concentration, fermentation, radiation, microwave heating and chemical preservatives. *Preq:* Physics and organic chemistry or biochemistry.

404, 604 Food Preservation and Processing II 3(3,0) Principles of food preservation applied to flow processes, ingredient functions, and the importance of composition and physical characteristics of foods related to their processing. Product recalls and product development concepts. *Preq:* Physics and organic chemistry or biochemistry.

405, 605 Food Preservation and Processing Laboratory I 1(0,3) Laboratory exercises on preservation methods, equipment utilized, and processes followed in food manufacture. *Coreq:* FDSC 403.

406, 606 Food Preservation and Processing Laboratory II 1(0,3) Continuation of FDSC 405 with greater emphasis on processes followed in food manufacture. *Coreq:* FDSC 404.

417 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

418 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

420, H420 Special Topics in Food Science 1-3(1-3,0) Comprehensive study of special topics in food science not covered in detail or contained in other courses. Contemporary developments in each topic area will be stressed. Maximum of 3 credits may be taken. *Preq:* Consent of instructor.

421, H421 Special Problems in Food Science 1-4(0,3-12) Independent research investigation in food science related to processing, preservation, packaging, or nutritional aspects of foods. Special emphasis will be placed on organizing a research proposal, conducting the research, and reporting the findings. Maximum of 4 credits may be taken. *Preq:* Senior standing or consent of instructor.

422, 622 Quality Assurance and Sensory Evaluation 2(2,0) Principles of food quality assurance programs with emphasis on the elements of sensory evaluation testing, sampling, inspections, federal and trade standards/grades, records and EVOP procedures.

424, 624 Quality Assurance and Sensory Evaluation Laboratory 1(0,3) Continuation of FDSC 422. The mechanics of quality assurance laboratory methods with emphasis on sensory evaluation panel testing, scoring, kinesthetic properties, and grade-quality measurements.

464, 664 Food Packaging Systems 3(3,0) Characteristics and application of various materials and systems used in the packaging of foods. Engineering properties of the materials and methods used to measure such properties are emphasized. Consideration is given to packaging systems for specific food applications. *Preq:* Consent of instructor.

466, 666 Food Packaging Systems Laboratory 1(0,3) Laboratory and field exercises on food packaging operations and packaging materials. Methods to evaluate the physical and chemical properties of packaging materials will be emphasized. *Preq:* Consent of instrutor.

491 Practicum 1-4 Supervised experiential opportunities in the food industry. *Preq:* Junior standing and consent of department head.

802 Food Enzymology 2(2,0)

804 Thermal Processing of Packaged Foods 3(3,0)

810 Chemical and Biochemical Aspects of Foods 4(4,0)

811 Physical and Thermo-Physical Properties of Food 3(3,0)

812 Microbiological Aspects of Food Systems 3(3,0)

820 Special Topics in Food Science 1-3(1-3,0)

821 Special Problems in Food Science 1-3(0,3-9)

851 Food Science Seminar 1(1,0)

852 Food Science Seminar 1(1,0)

891 Master's Research. Credit to be arranged.

FOOD TECHNOLOGY (FDTECH)

851 Food Technology Seminar 1(1,0)

991 Doctoral Disseration Research 1-6(0,1-6)

FORESTRY (FOR)

Professors: R. M. Allen, B. H. Box, B. M. Cool, B. A. Dunn, D. C. Guynn, Jr., D. L. Ham, R. L. Hedden, D. N. Hon, D. D. Hook, G. D. Kessler, C. L. Lane, W. H. McGregor, R. E. Schoenike, W. A. Shain, F. H. Tainter, M. A. Taras, *Head;* D. H. Van Lear, G. W. Wood, T. E. Wooten, R. Zahner; *Associate Professors:* G. R. Askew, Jr., J. B. Cody, G. A. Gresham, R. A. Harris, A. W. Lee, L. E. Nix, L. D. Reamer, V. L. Robinson, G. E. Sabin, T. M. Williams; *Assistant Professors:* J. L. Haymond, A. P. Marsinko, A. E. Miller, L. R. Nelson; *Instructors:* S. K. Nodine, T. A. Walsh; *Lecturers:* A. T. Shearin, J. H. Syme

101 Introduction to Forestry 1(1,0)F An informative sketch of forestry, forests, and forestry tasks of the nation; education and career opportunities for foresters.

102 Introduction to Forestry 1(1,0)S Continuation of FOR 101.

103 Society, Conservation, and Forestry 2(2,0)S Introduction to the historical, philosophical, and role of forests and forestry in society; relationship of man, forest, and conservation; major forest issues; and professional communications with the public.

205 Dendrology 3(2,3)F Classification, nomenclature, and identification of the principal forest trees of the United States, their geographical distribution, ecological requirements, and economic importance. Field identification of native trees and commonly planted exotics in the Piedmont and surrounding areas. *Preq:* BIOL 103, 105 or consent of instructor.

206 Silvics 4(3,3)S Study of the nature of forests and forest trees, how they grow, reproduce, and their relationships to the physical and biological environment. *Preq:* AGRON 202, BIOL 103 and 105, FOR 205 or consent of instructor.

209 (PRTM) Forest and Recreation Resources, Application of the Microcomputer 3(2,3) See PRTM 209.

221 Wood Properties I 3(2,3)F The formation of wood in forest trees, gross and minute characteristics of wood, defects in wood, variability in wood. *Preq:* BIOL 103, 105 or consent of instructor.

222 Wood Properties II 3(2,3)S Wood in relation to moisture, heat, sound, light, and electricity; mechanical properties of wood; standard testing procedures for wood. *Preq:* FOR 221 or consent of instructor.

251 Forest Plants 1(Summer Camp) Identification of principal native forest understory plants by vegetative and floral characteristics; their site requirements and forest-type associations with emphasis on successional patterns; and their value for man and wildlife. The preparation of a field herbarium is required of all students. *Preq:* BIOL 103 and 105, FOR 205 or consent of instructor.

252 Forest Engineering 3 (Summer Camp) Field and drafting practice in mapping, traversing boundaries, and road location; use of surveying equipment and techniques. *Preq:* CE 201, EG 105 or consent of instructor.

253 Forest Mensuration 4(Summer Camp) Practical application of field techniques including timber cruising, measuring tree heights and volumes, constructing volume tables and boundary line surveys. *Preq:* CE 201, EG 105, FOR 205 or consent of instructor.

254 Forest Products 1(Summer Camp) A tour of the forest products industry of South Carolina with an emphasis on those products and processes of some distinction or special interest.

255 Secondary Wood Products 1(Summer Camp) A tour of the secondary wood products industries with an emphasis on industries too far from Clemson for the usual half-day field trips during regular sessions. *Preq:* FOR 205 or consent of instructor.

257 Forest Products Measurements (Summer Camp) 2 Measurements and classifications of a variety of wood products, from trees to finished products. *Preq:* FOR 221, 222 or consent of instructor.

300 Christmas Tree Production 2(2,0)F Theory and practice of establishing, managing, and marketing trees with an emphasis on Christmas tree production in the South. *Preq:* Consent of instructor.

302, 602 Forest Mensuration 3(2,3)S A practical application of statistical and mensurational techniques in forest management. *Preq:* EXST 301, FOR 253 or consent of instructor.

304, 604 Forest Economics 3(3,0)F Economic problems and principles involved in the utilization of forest land and timber and in the distribution of forest products; cost analysis of integrated forest operations. *Preq:* ECON 212, MTHSC 106, or consent of instructor.

305 Elements of Forestry 2(2,0)F, S A compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management and utilization of forests, especially those of South Carolina. Not open to Forest Management majors. *Preq:* BIOL 103 and 105 or consent of instructor.

306, 606 Wood and Wood Fiber Identification 2(1,3)F Macroscopic and microscopic identification, properties, and uses of selected economically significant timbers. *Preq:* BIOL 103 and 105, or consent of instructor.

307 Elements of Forestry Laboratory 1(0,3)F, S Field and laboratory exercises in the fundamentals of forest land management considered in FOR 305. *Preq:* Registration in FOR 305.

308, 608 Aerial Photographs in Forestry 3(2,3)F An introduction to photographic measurements, aerial photo-interpretations, mapping, and timber estimating. *Preq:* CE 201, Forestry Summer Camp, or consent of instructor.

309 Arboriculture, Tree Care, and Maintenance 3(3,0) Principles, practices, and problems of protecting and maintaining trees in urban and recreational areas. Examines the environmental and biological factors that affect trees in high-use areas, their management and cultural requirements, and the practices necessary for their protection and care as valuable assets in the landscape. *Preq:* Junior standing or consent of instructor.

310, 610 Silviculture 4(3,3)S Theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Preq:* FOR 206, Forestry Summer Camp, or consent of instructor.

311 Forest Products Marketing Practices 3(3,0) Study of marketing practices currently employed by the forest-products industry and the application of basic marketing principles and strategic concepts in the industry's present and future marketing environment. *Preq:* Junior standing or consent of instructor.

312 Reproduction of Forest Trees 2(1,3)S, Odd-numbered years. Methods of reproduction in forest trees; seed propagation, propagation by rooting and grafting techniques; environmental requirements for propagation, media, and materials. The course covers theory and practical instruction, making use of indoor and outdoor propagating beds. Limited enrollment. *Preq:* FOR 205 or consent of instructor.

315 Woodland Ecology 2(2,0)S Overview of the forest emphasizing the living and nonliving components of the woodland habitat. Understanding man's use of the forest and interpreting the signs of plants, wildlife, and landscapes. Not open to Forestry majors. *Preq:* Junior standing or consent of instructor.

321 Drying and Machining of Wood 3(2,3)F Wood seasoning principles and practices, seasoning defects, machinery, and preparation of wood for processing. *Preq:* FOR 221, 222 or consent of instructor.

322 Wood Adhesives and Finishes 2(1,3)S Theory of adhesion, chemical bonding, rheology, chemistry of adhesion, theory of finishes, exterior coatings and paints for wood. *Preq:* CH 101, 102, FOR 221.

323 Deterioration and Preservation of Wood 2(2,0)S Deterioration agents, deterioration of wood in use, control of deterioration in manufacturing, preservation processes, types of preservation, fire retardants.

325 Chemical Aspects of Wood Utilization 3(2,1)F Fundamental physical, organic, and polymer chemistry is applied to chemical processing of wood. Structures, reactions, and applications of cellulose, hemicelluloses and lignin are discussed. *Preq:* CH 102 or consent of instructor.

403, 603 Forest Soils Seminar 1(1,0)S Study of forest soil characteristics with respect to site evaluation, forest fertilization, planting problems, watershed management, tree-soil-microorganism interactions, and trafficability. *Preq:* Junior standing or consent of instructor.

405, 605 Forest Influences 2(2,0)F Examination of the effect of forests and forestry on climate, water, soil, organisms, and humans. Reviews forest influences in relation to current environmental legislation and debate. *Preq:* FOR 206 or consent of instructor.

407, 607 Forest Operations 3(2,1)F Theory and practice of conducting forestry operations. Major emphasis on the methods, analysis of associated cost, and productive rates for timber harvesting and other mechanized field operations. *Preq:* Senior standing or consent of instructor.

409, 609 Multiple-Use Forestry 2(2,0)S Study of the demand placed on forests for a variety of products and uses, and how these can and must be reconciled in planning the management of each forest. *Preq:* Senior standing or consent of instructor.

411, 611 Harvesting Forest Products 3(2,3)S Application of engineering and cost analysis techniques to the evaluation of the forest transport system and various harvesting situations. *Preq:* FOR 407 or consent of instructor.

412, 612 Forest Protection 2(2,0)S Prevention and suppression of forest fires; their effect upon the environment and people; factors affecting fire behavior; and use of fire in resource management. *Preq:* Senior standing or consent of instructor.

413, 613 Integrated Forest Pest Management 4(3,3)F Nature and control of pests of forest trees and products. Will focus on the relation of pests to silviculture, management, and natural forest ecosystems. *Preq:* FOR 310 or consent of instructor.

414, 614 Forest Management Plans 2(2,0)S Analysis of factors entering into forest working plans of several forestry organizations; preparation of a preliminary management plan of a sample area. *Preq:* FOR 417.

415, 615 Forest Wildlife Management 3(2,3)F Principles, practices, and problems of wildlife management with emphasis on upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques are evaluated. *Preq:* FOR 310 or consent of instructor.

416, 616 Forest Policy and Administration 2(2,0)S Development, principles, and legal provisions of forest policy in the United States. Administrative and executive management in forestry. *Preq:* Senior standing or consent of instructor.

417, 617 Forest Management and Regulation 3(3,0)F Correlation of production factors and yields of forests; regulation of cuts and growing stock in sustained yield management. *Preq:* Forestry Summer Camp, FOR 304 and 310.

418, 618 Forest Valuation 3(3,0)F Capital investments in forestry and the returns derivable from them; valuation of land, timber, and other resources associated with forestry; appraisal of damage and stumpage values. *Preq:* FOR 304 or consent of instructor.

419 Senior Problems 1-3(1-3,0) Problems chosen with faculty approval in selected areas of forestry. *Preq:* Senior standing.

420, 620 Forest Products 3(2,3)S Primary forest products including lumber, poles and piles, veneers and plywoods, secondary wood products; chemically derived products from wood including pulp and paper, distillation products, wood hydrolysis; miscellaneous and minor forest products. *Preq:* FOR 306, Forestry Summer Camp, or consent of instructor

421, 621 Biology and Silviculture of Hardwood Forests 2(1,2)F Study of the silvics, growth, and development of major hardwood species of North America that will relate these biological characteristics to the ecology, silviculture, and utilization of the hardwood forests of the Eastern United States. *Preq:* FOR 205, 206, 306, 310, or consent of instructor

423, 623 Lectures in Forestry 2(2,0)F Lectures in various field of forestry delivered by selected representatives from forest industries, consultants, agencies, associations, and other forestry operations. To be taken on pass-fail basis only *Preq:* Junior standing or consent of instructor.

424, 624 Forest Genetics and Tree Breeding 3(3,0)S, Even-numbered years. History of genetics and breeding in forestry and its relation to silviculture; natural variation, hybridization and inheritance in forest trees, tree breeding objectives and methods. *Preq:* GEN 302 or equivalent, or consent of instructor

429, 629 Wood Design 3(2,3)F The technical mechanical properties of wood; load analysis and design criteria, design of structural elements in wood. *Preq:* FOR 328 or consent of instructor.

430, 630 Composite Wood Materials 3(2,3)F Manufacturing methods, physical and mechanical properties, and uses of wood-polymer composites, wood laminates, plywood, particleboard, fiberboard, reconstituted board products, structural sandwich panels, paper-base plastic laminates, and extruded and molded products. *Preq:* FOR 222, 328, or consent of instructor.

431, 631 Recreation Resource Planning in Forest Management 3(3,0)S, Odd-numbered years. Analysis of forest recreation as a component of multiple-use forest management; techniques of planning; physical and biological effects on forest environments; and forest site, user, and facility management.

432, 632 Forest Site Capability 2(2,0)S Analysis of use pressures on the forest land base and their effects on the capability of the forest to satisfy resource demands. Productivity and sensitivity of sites will be discussed. *Preq:* Senior standing in Forestry or consent of instructor.

434, 634 Foreign Woods and Their Properties 2(1,3)S Identification of commercially important foreign woods imported into the United States, their macroscopic and microscopic features, basic wood properties, and use. *Preq:* FOR 221, 306, consent of instructor

435, 635 Park and Forest Structures 2(2,0)F Selection, processing, protection, and maintenance of wood used in park and forest structures. *Preq:* Senior standing or consent of instructor.

436, 636 Wood as an Energy Source 2(2,0)S Study of the availability, characteristics, and processing required for using wood and bark as a source of energy. *Preq:* Senior standing or consent of instructor.

451, H451, 651 (AGE, ESE) Newman Seminar in Engineering 1(0,2) See AGE 451.

707 Special Problems 1-3(1-3,0)

801 Data Processing in Forestry Problems 3(2,3)

802 Advanced Mensuration 3(2,3)

803 Photo Interpretation 3(2,3)

804 Advanced Forest Economics 3(2,3)

805 Advanced Silviculture I—Forest Soils 3(3,0)

806 Advanced Silviculture II—Forest Tree Growth and Development 3(3,0)

807 Special Problems in Forestry. Credit to be arranged.

808 Seminar 1(1,0)

809 Products Biodeterioration 3(2,3)

825 Wood Chemistry 3(2,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

FRENCH (FR)

Professors: M. Cranston, R. R. McGregor, Jr., H. E. Stewart; *Assistant Professors:* D. Y. Brannock, Jr., D. J. Calvez, P. R. Heusinkveld, S. C. King, J. A. McNatt, J. B. Macy; *Instructor:* R. Willingham; *Visiting Assistant Professors:* C. J. Gallant, J. M. Sharkey; *Visiting Instructor:* C. G. Johnson

101, H101 Elementary French 4(3,1) A course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary French 4(3,1) Continuation of FR 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

151 French for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in French. A minimum grade of B on final exam will satisfy graduate school foreign language requirement. May be repeated once for credit. *Preq:* Graduate standing.

196 Practicum in French 1(0,1) On-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

198 Situational French 4(3,2) Intensive course relating to a student's field of study. Designed primarily for non-Liberal Arts majors preparing for employment or study abroad. Subsequent placement into FR 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements.

199 Situational French 4(3,2) Continuation of FR 198. Subsequent placement into FR 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements. *Preq:* FR 198 or consent of instructor.

201, H201 Intermediate French 3(3,0) A brief review of FR 101 and 102, with conversation, composition, and dictation, and the reading of more serious short prose pieces in French. *Preq:* FR 102.

202, H202 Intermediate French 3(3,0) While attention is paid to writing and speaking French, more stress is laid on the rapid reading of more difficult French prose than in the earlier courses. *Preq:* FR 201.

205 Elementary French Conversation and Composition 3(3,0) Intensive oral and written training in French through conversation groups, speeches, written composition, and controlled vocabulary acquisition. Required of all French majors and minors. May be taken concurrently with FR 202, 301 or 302. *Preq:* FR 201.

209 Introduction to French Phonetics 3(3,0) Study of the fundamental principles of the pronunciation of French through the use of the International Phonetic Alphabet and recordings. This course may not be used toward the satisfaction of the foreign language requirement in the Bachelor of Arts curriculum. *Preq:* FR 201 or equivalent.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

301 Survey of French Literature I 3(3,0) French literary movements and authors of the 19th and 20th centuries. *Preq:* FR 202.

302 Survey of French Literature II 3(3,0) French literary movements and authors from the Middle Ages through the 18th century. *Preq:* FR 202.

305 Intermediate French Conservation and Composition I 3(3,0) Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy Assignments in the language laboratory *Preq:* FR 202 or consent of department head.

307 French Civilization 3(3,0) Study of the significant aspects of the culture of France from its origins to the present. *Preq:* FR 202 or consent of department head.

316 French for International Trade I 3(3,0) Spoken and written French common to the French-speaking world of business and industry, with emphasis upon business practices and writing and translating business letters and professional reports Cross-cultural references provide opportunity for comparative and contrastive analysis of American and French cultural patterns in a business setting. *Preq:* FR 202 and 305 (either prereq. or concurrently); or consent of department head.

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits *Preq:* Consent of department head.

403 Twentieth Century French Prose and Poetry 3(3,0) The major literary themes and genres of the period and their influence upon other art forms. *Preq:* FR 301 or 302

404 Twentieth Century French Drama 3(3,0) Survey of French drama and its relationship to other literary and art forms. *Preq:* FR 301 or 302

405 Nineteenth Century French Romanticism 3(3,0) The Romantic movement as expressed in the works of its principal exponents during the century. *Preq:* FR 301 or 302.

406 Nineteenth Century French Literary Movements 3(3,0) Study of genres representative of the literary theories which contributed to the great diversity of the literature, painting, and music of the period. *Preq:* FR 301 or 302.

407 Eighteenth Century French Literature 3(3,0) The principal literary figures of the 18th century, with particular emphasis on Voltaire and Rousseau. *Preq:* FR 301 or 302.

408 Seventeenth Century French Literature 3(3,0) Major literary figures, themes, and forms of 17th century French literature. *Preq:* FR 301 or 302.

409 Advanced Grammar and Composition 3(3,0) Intensive study of syntax and stylistics through composition and translations. *Preq:* Senior standing or consent of department head.

411 Advanced French Conversation and Composition 3(3,0) Continuation of FR 305, with emphasis on greater fluency and sophistication in oral and written expression. *Preq:* FR 305 or consent of instructor.

416 French for International Trade II 3(3,0) Study of language and cultural environment of the French-speaking markets of the world, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* FR 316.

498 Independent Study 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

499, 699 Selected Topics in French Literature 3(3,0) Selected topics that have characterized French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

GENETICS (GEN)

Professors: P. M. Burrows, W. D. Graham, Jr., E. L. Kline, J. S. Rice, E. A. Rupert; *Associate Professors:* R. H. Hilderman, E. R. Shipe, W. M. Surver, D. G. Yardley; *Assistant Professors:* A. G. Abbott, W. C. Bridges, N. H. Walker

301 Genetics and Human Affairs 3(3,0) S, SS Basic genetic principles emphasizing human heredity and the relationship of genetics to society. Discussion of chromosome abnormalities, inborn errors of metabolism, sex-related traits, genetic counseling, and other current genetic topics. Course is designed as an elective for students in nonbiological science majors. Will not substitute for GEN 302.

302, H302 Introductory Genetics 4(3,3) Basic course introducing fundamental principles of inheritance in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical basis of heredity, population genetics, and microbial genetics. *Preq:* One year of introductory biology or consent of instructor.

405, 605 Molecular Genetics 3(3,0) S Course emphasizing molecular aspects of genetics in eukaryotes in relation to gene and chromosomal structure, the control of gene expression, developmental genetics, somatic cell genetics, and extra nuclear genetics. Designed to follow an introductory genetics course. *Preq:* GEN 302 or its equivalent and one semester of biochemistry, or consent of instructor. A developmental biology course is also strongly recommended.

451, 651 Advanced Genetics 3(3,0) F Advanced study of the principles of general genetics. Topics emphasized are variations in chromosome number and structure, natural and induced mutations, extranuclear inheritance, recombination, control of gene activity, genes and development, genetics of behavior patterns, population genetics, systems of mating, genetics and man. *Preq:* GEN 302 or equivalent.

701 Modern Development in Genetics 3(3,0)

801 Cytogenetics 3(2,3)

803 Biometrical Genetics 3(3,0)

806 Special Problems in Genetics 1-3(0,3-9)

890 Special Topics in Genetics 1-3(1-3,0)

GEOGRAPHY (GEOG)

Associate Professor: J. A. Miller

101 Introduction to Geography 3(3,0) Introduction to the tools, language, methodologies, and basic concepts of geography as a social science.

102 Human Geography 3(3,0) Introduction to modern geography as the study of environment, population, resources, and technology. Emphasis is placed on the human impact on natural systems of air, water, and land.

301 Political Geography 3(3,0) The geographic basis for and the geographical problems of the modern state; the relevance of geographical patterns of international affairs. *Preq:* GEOG 101 or 102.

302 Economic Geography 3(3,0) The geographic conditions fundamental to the world's resources (agricultural, mineral, commercial, and industrial), and the conditions which affect the utilization, marketing, consumption, and strategic significance of those resources. *Preq:* GEOG 101 or 102.

303 Urban Geography 3(3,0) Geographic survey of urban structures and environment. Topics include definitions of cities and urban characteristics, geography of cities in world history, contemporary city, urban land use, and social geography. Fieldwork in the South Carolina urban environment is required and culminates in a problem-oriented class project. *Preq:* GEOG 101 or 102.

401 Studies in Geography 3(3,0) Intensive study of the geography of a selected world region, such as North America, Europe, or the Middle East, or the geography of a topic such as the geography of oil or the geography of underdevelopment. With departmental permission, may be repeated once for credit. *Preq:* GEOG 101 or 102 or consent of instructor.

GEOLOGY (GEOL)

Professors: V. S. Griffin, Jr., G. M. Haselton, D. S. Snipes; *Associate Professor:* R. D. Warner; *Assistant Professor:* J. R. Wagner; *Lecturer:* J. G. Stillwell

101 Physical Geology 4(3,2) Study of the minerals and rock which compose the earth's crust, their origins and transformations. Emphasis is placed upon geological processes, both internal and external, by which changes are produced on or in the earth. Laboratory instruction is provided in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results

102 Historical Geology 4(3,3) Evolution, both organic and inorganic, is traced from the beginning of the record through the present. Laboratory instruction and field trips provide practice in the identification and study of plants and animals which have left their record as fossils in the rock of the earth's crust. *Preq:* GEOL 101.

400, 600 Environmental Geology 3(3,0) Discussion-oriented introductory study of the relationships of man to his physical surroundings and the problems resulting from upsetting the established equilibria of geologic systems; man's role as a geologic agent, environmental conservation and management.

402, H402, 602 Structural Geology 3(2,2) The diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Preq:* GEOL 101

403, H403, 603 Invertebrate Paleontology 3(2,3) Study of life of past geologic ages, as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.

404, H404, 604 Economic Geology 3(3,0) This course concerns the description and classification of ore deposits and commercial nonmetallic mineral deposits. The origin of mineral deposits and their occurrence is emphasized. Problem studies and field trips to nearby mines and quarries. *Preq:* GEOL 306.

405, 605 Geomorphology 4(3,3) Study of the surface features of the earth—their form, nature, origin, development, and the change they are undergoing. *Preq:* GEOL 101, 102, or consent of instructor.

406 Mineralogy 3(2,3) Introduction to fundamental concepts of crystallography and crystal chemistry. Topics include crystal symmetry, principles of crystal structures, introductory x-ray crystallography, composition and stability of minerals, and systematic mineralogy. Laboratory exercises emphasize the recognition of crystallographic features and identification of minerals based on their physical properties.

407, 607 Quaternary Geology 3(2,2) Early concepts about glaciation. Types and distribution of glaciers today and during their maximum extent. Glacial erosion, transportation and ice-sculptured terrain features. Study of quaternary sediments and their chronology. Drainage changes, sea level fluctuations and crustal deformation. Detailed study of specific areas as time permits. Field trips.

408, 608 Geohydrology 3(3,0) Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101, 102

409, H409, 609 Petrology 3(2,3) Genesis, evolution and classification of rocks through lectures, laboratory exercises, and field trips. The occurrences, chemical relationships, and distribution of rock types are emphasized. *Preq:* GEOL 406.

410, H410, 610 Optical Mineralogy 3(1,5) Involves techniques of mineral identification with the polarizing microscope. Criteria are provided for the determination of optical properties using oil immersion grain mounts. The student is also introduced to the study of minerals and rocks in thin section. Lecture topics explore mineral optics theory. *Preq:* GEOL 406.

411, 611 Research Problems 1-3(0,3-9) Field, laboratory, or library study of an approved topic in geology. Topic would be one not normally covered in formal courses, but may be an extension of a course. Taught either semester and may be taken more than once for a maximum of 6 credits. *Preq:* Senior standing in Geology or consent of instructor.

413, 613 Stratigraphy and Sedimentation 3(2,2) The process by which sediments are eroded, transported, and deposited (sedimentation), with major emphasis on relationships of the age and time distribution of stratified rocks and their historical significances (stratigraphy). *Preq:* GEOL 101 and 102 or consent of instructor.

700 Earth Science I: Geology for Science Teachers 3(2,3)

711 Earth Science II: Special Topics in Geology for Science Teachers 1(0,2)

GERMAN (GER)

Professor: H. M. Riley; *Associate Professors:* J. M. Melton, *Acting Head;* M. M. Sinka, P. W. Wannamaker; *Assistant Professor:* E. P. Arnold

101, H101 Elementary German 4(3,1) A course for beginners in which, through conversation, composition and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

151 German for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in German. A minimum grade of B on final exam will satisfy graduate school foreign language requirement. May be repeated once for credit. *Preq:* Graduate standing.

196 Practicum in German 1(0,1) An on-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

198 Situational German 4(3,2) Intensive course relating to a student's field of study. Designed primarily for non-Liberal Arts majors preparing for employment or study abroad. Subsequent placement into GER 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements.

199 Situational German 4(3,2) Continuation of GER 198. Subsequent placement into GER 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements. *Preq:* GER 198 or consent of instructor.

201, H201 Intermediate German 3(3,0) Brief review of GER 101 and 102, with conversation, composition and dictation, and the beginning of more serious reading of German prose in short stories and plays. *Preq:* GER 102.

202, H202 Intermediate German 3(3,0) Emphasis on reading nontechnical German prose more rapidly. Writing, speaking, and listening skills will continue to be developed. *Preq:* GER 201 or consent of department head.

205 Elementary German Conversation and Composition 3(3,0) Intensive oral and written training in German through conversation groups, speeches, written compositions, and controlled vocabulary acquisition. Recommended for all German majors. *Preq:* GER 201. *Coreq:* GER 202, 301 or 302.

251 Scientific German 3(3,0) An alternate course to GER 202, especially for students in the sciences. Readings will be chosen from various fields. Grammar and syntax will be reviewed to ensure accurate translations, but stress will be on reading for understanding. *Preq:* GER 201 or consent of department head.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

301 Twentieth Century German Drama 3(3,0) Selected works from major German-speaking dramatists of the 20th century, including Brecht, Duerrenmatt, and Frisch. Required of German majors. *Preq:* GER 202 or consent of department head.

302 Twentieth Century German Prose and Poetry 3(3,0) Selected prose and poetry from major 20th century German-speaking authors, including Rilke, Mann, Hesse, Kafka, and Boell. Required of German majors. *Preq:* GER 202 or consent of department head.

305 Intermediate German Conversation and Composition 3(3,0) Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy. Required of German majors. *Preq:* GER 202, 205, or consent of department head.

307 German Civilization 3(3,0) Study of significant aspects of the culture of the German-speaking peoples from their origins to the present. *Preq:* GER 202 or consent of department head.

316 German for International Trade I 3(3,0) Spoken and written German common to the German-speaking world of business and industry, with emphasis upon business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and German cultural patterns in a business setting. *Preq:* GER 251 or 202 and 305 (preq or concurrently); or consent of department head.

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in German literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

401 Studies in German Literature I 3(3,0) Selected topics in German literature from the beginnings to 1832. *Preq:* GER 301, 302, or consent of department head.

402 Studies in German Literature II 3(3,0) Study of selected topics in 19th or 20th century German literature. *Preq:* GER 301, 302, or consent of department head.

403 Studies in German Literature III 3(3,0) Study of a major theme in German literature within a chosen time period or in the work of one major author. The themes may be subject- or genre-oriented. *Preq:* GER 301, 302, or consent of department head.

411 Studies in the German Language I 3(3,0) Advanced training in the spoken and written language with emphasis on vocabulary, syntax, and stylistics. *Preq:* GER 305 or consent of department head.

412 Studies in the German Language II 3(3,0) Indepth study of terminology and syntax for specific subject areas in business, in the liberal arts, and in the sciences. *Preq:* GER 301, 302, 305, or consent of department head.

413 Studies in German Culture 3(3,0) Intensive study of selected topics concerning cultural phenomena of the German-speaking nations. *Preq:* GER 301, 302, 305, or consent of department head.

416 German for International Trade II 3(3,0) Study of language and cultural environment of the German-speaking markets of the world, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* GER 316.

498, 698 Independent Study 1-3(1-3,0) Supervised study of selected topics in German literature, language, or culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

GRADUATE STUDIES (GS)

799 Comprehensive Studies 1-15

GRAPHIC COMMUNICATIONS (GC)

101 Orientation to Graphic Communications 1(1,0) Introduction to the curriculum and the industry including its processes, products, and careers. Emphasis is placed on the attributes which are most desirable for successful entry and advancement up a variety of career ladders.

104 Graphic Arts I 3(1,6) Major emphasis is placed on the basic principles underlying the graphic arts. Many areas of study include general photography, graphic layout and design, process photography, offset lithography, screen printing, and bindery. Modern industrial applications are stressed throughout the course.

207 Graphic Arts II 3(1,6) Continuation of GC 104. An intermediate course for the graphic communications and graphic arts specialists which broadens skills and technical knowledge in areas of layout, copy preparation, reproduction photography, film assembly, screen printing, lithographic presswork, and finishing. *Preq:* GC 104.

304, H304 Photographic Techniques 3(1,6) Emphasis is placed on application of black and white photography as activities for vocation and avocation. Sufficient laboratory experiences are provided to assure confidence in the use of photographic techniques. Problems encountered in action, portrait, still life, and character-study photography are considered.

350 Graphic Communications Internship I 1(0,3) Full-time supervised employment in an industrial in-plant setting for expansion of experience with materials and processes, production people, and organizations. *Preq:* GC 104 or 207 or equivalent and consent of instructor.

406, H406, 606 Problems in Specialty Printing 4(2,6) Study of the problems and processes for printing and converting in package label and specialty industries. Laboratory applications include flexographic preparation, printing, and die cutting; die making and die cutting screen and offset printed sheet stock; sublimation and plastisol transfer printing; plastic and metal container printing. *Preq:* GC 207 and INED 105.

440, H440, 640 Advanced Lithographic Methods 4(2,6) Students selecting to pursue the area of graphic arts will gain experience in the development of advanced techniques of layout and design; photographic copy preparation; cold type composition; line, halftone, duotone, and special-effects photography, full color reproduction and advanced platemaking; process stripping, and color offset presswork. *Preq:* GC 207.

444, H444, 644 Current Developments and Trends in Graphic Communications 3(2,3) Study of commercial and industrial printing control. Emphasis is placed upon consideration for decision making in the areas of process and equipment selection and plant layout. Other topics include production flow, cost analysis, and recent developments as they affect production. *Preq:* GC 207, 440.

448, H448, 648 Planning and Controlling Printing Functions 3(3,0) Study of systems for setting printing production standards, estimating, scheduling, job planning, and the selection of new hardware and technologies. *Preq:* GC 440 and/or consent of instructor.

450 Graphic Communications Internship II 1(0,3) Continuation of GC 350. *Preq:* GC 350, 440, and 450 and/or consent of instructor.

451 Special Projects in Graphic Communications 1-6(0,3-18) Advanced projects covering theory and/or practices going beyond the scope of regular coursework. Written project approval required before registering. *Preq:* Junior or Senior with three graphic communication courses completed.

HISTORY (HIST)

Professors: J. L. Arbena, C. K. Bleser, R. M. Golden, J. W. Johnson, D. M. McKale, T. Perdue, J. V. Reel, Jr., A. Schaffer, R. A. Waller, J. R. Wunder, *Head; Associate Professors:* T. J. Kuehn, J. A. Miller, E. E. Moise, D. G. Paz, R. L. Saunders, Jr., W. F. Steirer, Jr.; *Assistant Professors:* E. D. Carney, C. A. Grubb, R. P. Leemhuis, P. E. Mack, R. R. Owens, H. L. Suggs; *Adjunct Professor:* W. Wates; *Adjunct Associate Professor:* M. R. Heintze; *Adjunct Assistant Professor:* B. S. Ledbetter

100 Higher Education and Clemson 1(1,0) Introduction to higher education. Its background and development in the western world, emphasizing land-grant institutions and Clemson University in particular.

101, H101 History of the United States 3(3,0) The political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

102, H102 History of the United States 3(3,0) Political, economic, and social development of the American people from the end of Reconstruction to the present.

172, H172 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from ancient times to the seventeenth century.

173, H173 Western Civilization 3(3,0) Political, economic, and social movements of Western Civilization from the seventeenth century to the present.

191 The World in the Twentieth Century 3(3,0) History of the world in the 20th century which integrates American, European, and non-Western development and which traces the historical roots of contemporary issues in politics, economics, international relations, society, culture, and the arts. Cannot substitute for the HIST 172/173 requirement in the College of Liberal Arts.

198 Current History 1(1,0) Examination of the major events and problem areas in the news with emphasis on their historical context and possible long-range significance. May be taken a total of three times for credit Does not count toward the requirements of the major or minor in History.

300 History of Colonial America 3(3,0) Development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

301 American Revolution and the New Nation 3(3,0) Study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis will be placed upon developing an understanding of individual motivation and ideological development present during the last four decades of the eighteenth century.

302 Age of Jefferson, Jackson, and Calhoun 3(3,0) Formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

303 Civil War and Reconstruction 3(3,0) Study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis will be placed in the historical controversies which the period has inspired.

304 Industrialism and the Progressive Era 3(3,0) Study of American society in the period between 1880 and 1930s. This course emphasizes the effects of industrialization and urbanization on the American people.

305 United States Since 1933 3(3,0) Particular emphasis will be given to the Great Depression, World War II, the Cold War, and domestic developments in the 1950s and 1960s.

306 American Economic Development 3(3,0) Economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulations and policy.

307 Recent United States Diplomatic History 3(3,0) History of American foreign policy from the late nineteenth century to the present, showing the rise of America's world interests and gradual involvement in global affairs. Emphasis is placed on the role of public opinion in foreign policy.

308 American Legal History 3(3,0) Survey of the American legal system in its historical perspective, from Colonial time to the present. Emphasis will be placed on the relationship between law and society, the way in which the practice of law changes American society, and the way in which social development affected both the theory and practice of the law.

309 History of Technology 3(3,0) History of the major developments in Western technology with an emphasis on specific technologies and their relationships to the societies and cultures in which they flourished.

310 History of American Technology 3(3,0) History of developments in technology and their role in American life with particular emphasis on the American Industrial Revolution and the 20th century.

313 History of South Carolina 3(3,0) Political, economic, and social development of South Carolina from 1670 to the present.

314 History of the South 3(3,0) Origins and development of political, economic, and cultural institutions of the South from the Colonial period to the present, and the role of the South in the nation's development.

315 Black History in America 3(3,0) Study of the Afro-American experience in the United States, from the African past, through slavery, to the present.

316 American Social History 3(3,0) Study of American society, including the relationship among classes, ethnic groups, regions, and sexes, from the Colonial period to the present.

317 The Trans-Appalachian Frontier 3(3,0) Consideration of the American frontier between the Atlantic coast and the Mississippi River, through the mid-1800s.

318 History of American Women 3(3,0) Survey course of the history of American Women emphasizing the changing role of women in American culture and society.

321 History of Science 3(3,0) Survey of the development of science in the Western world, emphasizing the period from the Renaissance to the present.

330 History of Modern China 3(3,0) Growth and development of Chinese civilization from ancient times to the present. Emphasis in the course is on 20th century China, particularly since the rise to power of the Communist regime.

333 History of Modern Japan 3(3,0) The origin and development of Japanese civilization with particular emphasis on modern Japan from mid-19th century to the present.

340 Ancient Americans 3(3,0) Introduction to the geography of the Western Hemisphere; origin of human life in the Americas; structure and accomplishments of the major pre-Columbian societies, with an emphasis on the rise and decline of the Classic civilizations; the impact of the European conquest; the formation of a new Ibero-American culture.

341 Modern Mexico 3(3,0) Introduction to the geography of the region, origins, and progress of the Independence movements and political, economic and social developments after 1825; current domestic and international problems.

342 South America Since 1800 3(3,0) Introduction to the geography of the region; origins and progress of the Independence movements; political, economic and social developments after 1825; current domestic and international problems.

351 Ancient Near East 3(3,0) History of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Geography, mythology, religious and economic currents, as well as the methods and discoveries of archaeology will be included.

354 The Greek World 3(3,0) Study of Greek civilization from its beginning until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.

355 The Roman World 3(3,0) The rise of Rome to world empire and the international civilization it dominated. Concentration on the nature of the political change from Republic to monarchy with particualr emphasis on city life and the causes of its decline.

361 History of England to 1603 3(3,0) The evolution of English political, social, economic, and cultural institutions to the seventeenth century.

363 History of England Since 1603 3(3,0) The evolution of English political, social, economic, and cultural institutions from the seventeenth century to the present.

370 Medieval History 3(3,0) Survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.

372 The Renaissance 3(3,0) Examination of the transitional period of European civilization (ca. 1300-1500), with emphasis on institutional, cultural, and intellectual developments.

373 Age of the Protestant Reformation 3(3,0) Evolution of Modern Europe (ca. 1500-1660), as affected by the Reformation, wars of religion and growth of nation-states. The study will include intellectual advances and the beginnings of European expansion overseas.

374 Europe in the Age of Reason 3(3,0) Study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the eighteenth century Enlightenment.

375 Revolutionary Europe 3(3,0) History of Europe from the outbreak of the French Revolution through the Revolutions of 1848, with emphasis on the conflict between the forces of change and those of conservation within the states and in Europe in general.

377 Europe in Crisis, 1914 to the Present 3(3,0) Study of the political, economic, and social institutions of the European peoples from 1914 to the present. Attention will be given to the world wars and to the collapse of the European state-system.

382 History of Modern Germany 3(3,0) German history from Bismarck and unification in 1870 through the period of Hitler and the Nazis to Germany's role in present-day Europe.

384 History of Modern France 3(3,0) French history from the mid-19th century to the present with particular emphasis on France since 1900.

386 History of Modern Russia 3(3,0) Russian history in the 20th century Emphasis is on the Russian revolution of 1917 and on Russian development under Lenin, Stalin, and the leadership of the Communist Party

390 Modern Military History 3(3,0) Survey of the development of modern warfare, and the influence of technological change on warfare. Particular attention will be given to the major conflicts of the 20th century.

With departmental consent, any 400-level course in history may be repeated one time for credit. The 400-level courses require students to do historical research and writing.

400, 600 Studies in United States History 3(3,0) Topics and problems in the history of the United States from the Colonial era to the present.

440, 640 Studies in Latin American History 3(3,0) Consideration of selected and varied topics in Latin American history through readings, class discussions, and individual or group projects. Special attention will be given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective.

450, 650 Studies in Ancient History 3(3,0) Selected topics in the field of ancient history ranging from pre-Biblical times to the fall of the Roman Empire.

460, H460, 660 Studies in British History 3(3,0) Examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present.

470, 670 Studies in Early European History 3(3,0) Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization.

471, 671 Studies in Modern European History 3(3,0) Study of selected topics or problems in European history from the end of the Old Regime to the present.

491, H491, 691 Studies in the History of Science and Technology 3(3,0) Selected topics in the development of science and technology, with emphasis on their social, political and economic effects.

492, 692 Studies in Diplomatic History 3(3,0) Selected topics and problems in international conflict and conflict resolution among nations. Concentration will usually be in twentieth century history.

493, 693 Studies in Social History 3(3,0) Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies.

494, 694 Studies in Comparative History 3(3,0) Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations.

495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations.

496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice.

499 Independent Study 1-3(1-3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. The student and faculty member develop a course of study designed for the individual student and approved by the head of the department prior to registration.

700 United States Through the Civil War 3(3,0)

710 United States Since 1865 3(3,0)

720 Southern History 3(3,0)

760 British History 3(3,0)

770 Europe to the Eighteenth Century 3(3,0)

775 Europe Since the Eighteenth Century 3(3,0)

790 Historical Area Studies 3(3,0)

800 Seminar in United States History 3(3,0)

860 Seminar in British History 3(3,0)

870 Seminar in European History 3(3,0)

880 Special Topics in History 3(3,0)

885 Independent Study 3(3,0)

891 Master's Research. Credit to be arranged.

892 Archival Management: An Introduction 3(3,0)

893 Practicum in Archival Management 3(0,9)

HORTICULTURE (HORT)

Professors: J. A. Brittain, *Acting Head;* D. C. Coston, R. G. Halfacre, A. R. Mazur, L. C. Miller, W. L. Ogle, B. B. Rhodes, E. T. Sims, Jr.; *Associate Professors:* D. W. Bradshaw, D. W. Cain, M. T. Haque, A. R. Kingman, A. J. Pertuit, Jr., D. F. Wagner, T. Whitwell; *Assistant Professors:* J. D. Caldwell, J. W. Kelly

200 Urban Horticulture 2(2,0) Study of various areas of horticulture as they affect the daily affairs of man. Topics include the horticultural industry, factors influencing plant growth, establishment and maintenance of home grounds, house plants, care of perishable horticultural products, and flower arranging.

201 General Horticulture 3(2,2)F Working knowledge of the fundamental plant processes is developed, showing the influence of light, temperature, water and nutrients upon vegetative growth and reproduction of horticultural plants. Production practices, harvesting, storage and marketing of the principal fruit, vegetable and ornamental crops are discussed with demonstrations and practice in greenhouse and orchard. *Preq:* BIOL 103, 105, or CH 101.

302 Principles of Vegetable Production 3(2,3)F Odd-numbered years. The general principles of vegetable growing and handling. Phases receiving special emphasis are economic importance, producing areas, management practices, plant forcing, cultural practices, irrigation, quality factors, harvesting, grading, packing, storage, market inspection, transportation, refrigeration, exhibition and seed production. *Preq:* HORT 201.

303 Plant Materials 3(2,3)F Woody, ornamental plants and their aesthetic and functional uses in landscape developments. The study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

304 Designing with Herbaceous Plant Materials 3(2,3)S Covers the study of habit of growth, size, period of bloom, color, and cultural requirements of herbaceous plant materials as well as introductory design incorporating the use of both herbaceous and woody-plant materials. *Preq:* HORT 303 or consent of instructor.

305 Plant Propagation 3(2,3)F All phases of plant propagation from seeds, bulbs, divisions, layers cutting, budding, and other types of grafting are comprehensively treated. Timing, manner and material for making cuttings; temperature and media requirements and propagation structures for rooting cuttings of ornamental and fruit trees, shrubs, and indoor plants will be studied. *Preq:* HORT 201 or consent of instructor.

308 Landscape Design 4(3,3) Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. *Preq:* HORT 303.

310 Floriculture 3(3,0)S Greenhouse production of commercial flower crops. Studies include fertilizers and insect and disease problems of bench and pot plants. *Preq:* HORT 201

352, 652 Commercial Pomology 3(2,3)F Fruit bud formation, rest period and water relations of fruit plants, soils, fruit setting; orchard soil management and responses of various fruits to fertilizers; principles of pruning, effect of climatic differences, freezing of tissues and means of avoiding injury; harvesting, transportation and storage. *Preq:* HORT 201.

406, 606 Nursery Technology 3(2,3)S Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

407, 607 Landscape Design 3(2,3)F The first half of this course is a study of trees, shrubs, vines and ground covers used in landscape planting. Attention is given to cultural requirements, growth habits, period of bloom, texture, and fall color. The second half of the course is devoted to landscape planning for small residential properties.

408 Special Problems in Horticulture 1-3(0,3-9) Independent investigation in horticulture. Emphasis will be placed on organizing a quality proposal, conducting the investigation, and reporting of findings at a professional society meeting and/or in a professional publication. Cumulative maximum of 3 credits. *Preq:* Minimum of 75 hours completed and consent of instructor.

409 Seminar 1(1,0)F Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

410 Seminar 1(1,0)S Continuation of HORT 409.

412, 612 Turfgrass Management 3(2,3)F Studies of warm and cool season turfgrasses in relation to value, use, regional adaptation, establishment, soils, and cultural practices. The influence of environmental, cultural, and genetic factors on turf quality and serviceability. Identification of grass and weed species and discussion of programs for the management of lawns, parks, roadsides, and golf courses. *Preq:* BIOL 103, 105 or equivalent.

415, 615 Foliage Plants for Interior Utilization 3(2,3)F Application of foliage plant requirements for their selection and maintenance in interior environments. Laboratories include plant identification, experiment, and graphic representation. *Preq:* BOT 205, HORT 201 and consent of instructor.

416 Floral Design 2(1,3)F Topics covered include simple arrangements (history, containers, mechanical aids, etc.), arrangements for specific occasions, church arrangements, funeral designs, bride's bouquets, dried arrangements and flower preservation, corsage work, foliage arrangements, bonsai, terrarium, Christmas wreaths, and foliage plant identification. *Preq:* BIOL 103, 105 or equivalent.

433, 633 (AGRON) Integrated Weed Management for Agronomic and Horticultural Crops 3(3,0) Weed management systems consisting of cultural, chemical, and biological methods will be studied for the major agronomic and horticultural crops of South Carolina with problem-solving methodology and herbicide injury diagnosis. *Preq:* AGRON 407.

454, 654 Subtropical and Tropical Horticulture 3(3,0)S Survey of the horticultural characteristics, culture, harvesting, and handling of subtropical and tropical fruits, vegetables, and ornamental crops of economic significance. The history, importance, adaptation, and world use of these crops will be studied. *Preq:* AGRIC 104 or BIOL 103, 105, and HORT 201 or consent of instructor.

455, 655 Small Fruit and Nut Crops 4(3,3)F Indepth survey of taxonomical, morphological, and physiological characteristics of small fruit and nut crops as they relate to the study of horticultural characteristics, culture, production, harvesting, and handling of both commerical and homegrown grapes, blueberries, strawberries, brambles, pecans, and walnuts. *Preq:* HORT 305 or consent of instructor.

456, 656 Vegetable Crops 3(3,0)S Principles and practices employed in the commercial growing and marketing of vegetable crops. Emphasis is placed on temperature requirements, plant characteristics, varieties, soils, fertilizers, weed control, harvesting and preparation for market.

461, H461, 661 Problems in Landscape Design 4(3,3)S Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used; original problems; field study. *Preq:* HORT 308, 407, or consent of instructor.

462, 662 Landscape Design Implementation 3(2,3)F Implementation of landscape plans, including interpretation of specifications, bidding, planting methods, construction materials and installation methods, irrigation, lighting, and allied landscape specialties. In addition maintenance contracts, equipment, methods, materials, and labor management are studied. *Preq:* HORT 308.

464, 664 Postharvest Horticulture 3(2,2)F Study of the biological aspects of methods and practices relating to the harvesting, handling, transportation, and storage of horticultural commodities for fresh market. Topics include an introduction to postharvest physiology, concept of quality and its measurement, standard and innovative postharvest treatments, grades and standards, and various storage methods.

470, 670 Hortitherapy 3(3,0) The appeal and techniques involving the art and science of horticulture for exceptional populations will be emphasized. A number of activities suited for almost any therapeutic setting for the visually, physically, and mentally impaired will be planned and conducted. *Preq:* BIOL 103, 105 and consent of instructor.

471, 671 Internship 1-6(0,2-12) Internship under competent supervision in an approved agency dealing with horticultural endeavors. Internships will be designed to provide students with on-the-job horticultural experience. The student will submit monthly reports during the internship and will conduct a departmental seminar at its conclusion. *Preq:* Junior standing and consent of instructor.

701 Horticulture: Plant and Environmental Science 3(3,0)

801 Problems in Small Fruit Production 3(3,0)

802 Research Systems in Horticulture 3(2,3)

803 Experimental Olericulture 3(3,0)

804 Scientific Advances in Ornamental Horticulture 3(3,0)

805 Physiochemical Procedures for Determining Quality in Horticultural Crops 3(2,3)

806 Postharvest Physiology and Handling of Horticultural Crops 3(3,0)

807 Pomology 3(3,0)

809 Seminar I 1(1,0)

810 Seminar II 1(1,0)

812 Special Problems in Horticulture 1-4(1-4,0)

870 Practicum in Hortitherapy 3(1,4)

891 Master's Research. Credit to be arranged.

921 (BOT) Plant Physiology Colloquium 1(1,0)

991 Doctoral Research. Credit to be arranged.

HOSPITAL AND HEALTH SERVICES ADMINISTRATION (HADM)

Associate Professor: J. M. McDonald

408, 608 Hospital and Health Services Administration 3(3,0) Survey of how hospital and health-care administration is practiced within the United States. Topics include planning; social, legal, and political considerations; alternate forms of organization; management practices; control systems; and trends/issues facing the future of health-care administrators. *Preq:* Senior or graduate-level standing or consent of instructor.

410, 610 Hospital Internship 3(0,9) The student will spend nine hours per week on a specified program of observing, practicing and experiencing the duties of hospital administrators in selected local hospitals. The course will be specifically outlined along with the amount of time the student will spend in each phase or department of the hospital. Student progress will be constantly monitored by University faculty and hospital staff. *Preq:* HADM 408.

HUMANITIES (HUM)

Professor: J. J. McLaughlin; *Associate Professors:* S. K. Eisiminger, E. A. Freeman, V. A. Rudowski

301 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with prehistory and continuing to the Renaissance.

302 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with the 17th century and continuing to the present.

305 Studies in Science, Technology, and the Humanities 3(3,0) Interdisciplinary course that seeks an understanding of science and technology through the perspectives of the liberal arts. Specific subjects vary with the instructor May be repeated once for credit.

306 Creative Genius in Western Culture 3(3,0) Investigation of creativity through study of great innovators in art, literature, music, and ideas. May be repeated once for credit.

309 Studies in Humanities 3(3,0) Interdisciplinary approach to the humanities. Specific subject matter varies according to the instructor and as approved by the Dean of the College of Liberal Arts. May be repeated for credit one time.

INDUSTRIAL EDUCATION (INED)

Professors: P. C. Caley, J. P. Crouch, D. E. Maurer, H. E. Morgan, Jr., A. F. Newton, *Head;* D. H. Pate, Jr., W. E. West; *Associate Professors:* B. V Burkett, Jr., C. H. Isbell, G. G. Lovedahl, D. G. Tesolowski; *Assistant Professors:* S. T. Ingram, C. D. Schmittou; *Instructor:* J. M. Leininger

101 Introduction to Industrial Education 1(1,0) Introduction to the field of industrial education in terms of the underlying philosophies, the aims and goals, and the specific objectives of each of the Industrial Education options. Course activities include research and field experiences in industrial education.

102 Woodworking I 2(1,3) Study of wood, its properties and the requisite skills necessary for understanding the use of wood in our technological way of life.

103 Woodworking II 2(1,3) Continuation of INED 102 in the study of wood, its properties, skills in machine and tool use with wood, project design, project costs and finishing processes necessary for teachers of industrial subjects. *Preq:* INED 102, 106.

105 Machining Practices 3(1,6) Basic practical shop experiences on the lathe, drill press, milling machine and shaper. Benchwork, measuring tools, theory and demonstrations related to a survey of fundamental machining practices.

106 Drafting for Industrial Education I 3(1,6) Basic drafting course which deals with sketching, orthographic projection, isometrics, sections, auxiliary views, dimensioning, developments, and intersections.

107 Drafting for Industrial Education II 3(1,6) Continuation of INED 106, dealing with drafting in specific fields such as welding, electronics, topography, and computer-aided drafting. Working and detail drawings of machine parts including threaded fasteners, cams and gears, and techniques of inking are studied. A portion of the course is devoted to organizing materials for teaching drafting. *Preq:* INED 101, 106 or equivalent, and consent of instructor.

108 Training Programs in Industry I 3(3,0) Introduction and first-hand experience in industrial training programs. Emphasis placed on observing and participating in actual training situations as well as communications and media usage in industry. *Preq:* INED 101.

203 Basic Metal Processes 3(1,6) Material separating, forming and combining practices in the metals industries through the study of basic casting, welding and sheet metal techniques.

205 Power Technology 3(2,2) Study of power in terms of energy sources, and the generation, transmission and utilization of power. Emphasis is placed on the development of insights and understandings of the scientific and operational principles involved in the production, transmission and utilization of power. *Preq:* INED 101 or consent of instructor.

206 Advanced Drafting and Design 3(1,6) Study of the relationship of designing and engineering, the design process, stylistic periods, design, research, and product development. Various methods of technical illustration are utilized in the course. *Preq:* INED 106 or equivalent.

208 Electricity 3(2,3) Theory and application of dc and ac fundamentals, including instrumentation, power sources, circuit analysis, motors, construction wiring, and electronic principles and components. *Preq:* INED 101.

215 Technical Airbrush Illustration 3(1,6) Course dealing with the technical application of airbrush technique. Methods of depicting objects on paper, photograph retouching, sandblasting glass, and fabric decoration are all dealt with, using a single-action airbrush.

220 Recreational and Avocational Crafts 3(2,3) Provides exploratory experiences in the performance of a variety of arts and crafts activities, and encourages the development of an understanding of the purpose of arts and crafts in the comprehensive recreational program.

302 Dwelling Materials and Construction Methods 2(1,2) This course is designed as an introduction to the commonly used building materials and the methods of combining them in present day construction. *Preq:* INED 102.

310 Methods of Trade Teaching 3(3,0) Designed to give basic instruction to beginning teachers in tradework. Psychological factors of learning, individual differences, methods of teaching subjects, the special methods used in teaching skills, grading of students and keeping of proper records and reports. Offered in Summer Sessions only.

313 Arts and Crafts 3(1,6) Study of the art and craft of designing and making well-designed, useful objects. Emphasis on the development of skill and knowledge in the industrial crafts. Included will be laboratory activity involving work with wood, metal, ceramic, textiles, paper, plastics, and leather materials. *Preq:* INED 101.

316 Plastics and Plastic Processes 3(2,3) Introduction to thermoplastic materials, basic processing, fabricating, and finishing operations. Related careers and technological advances will also be studied. *Preq:* INED 101.

317 Management of Industrial Education Laboratories 3(2,2) Management and operation of unit and multiple-activity laboratories, including laboratory design, selection and procurement of tools and equipment, budgeting management, and coordination of activities in laboratory courses.

320 Machine Woodworking 2(1,3) Basic characteristics of woodcutting, shaping, and finishing operations by use of machinery and auxiliary tools. Includes project work. *Preq:* Junior standing.

325 Industrial Organizations and People 3(3,0) Study of the relationship of training and safety personnel to the kinds of tasks they are asked to perform in industrial situations. Emphasis is on safety knowledge development and on techniques which may be used in industrial safety training. *Preq:* INED 101 or consent of instructor.

350 Industrial Cooperative Experience I 1(0,3) Full-time work experience program in industry. The course is offered during the summer only. Students are requested to register with the instructor one semester prior to the summer in which they plan to enroll. *Preq:* Junior standing in the Vocational-Technical Education program; consent of instructor.

372 Arts and Crafts for the Elementary Child 3(2,3) Provides the elementary school teacher with an opportunity to develop skills and knowledge in the use of a variety of media suitable for integrating the study of industry and industrial technology into the usual classroom procedures.

402 Directed Teaching 12(0,36) Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. *Preq:* INED 317, 425, and grade-point ratio required for graduation.

404, 604 Organization of Industrial Training Materials 3(3,0) Study of the identification, selection, and organization of subject matter appropriate for industrial training programs. Emphasis is placed on analysis techniques, session and demonstration planning, written instructional materials development, trainee evaluation, and planning instructional schedules. *Preq:* Education for Industry option, Senior standing, INED 108, and completion of a minimum of three courses selected from GC 104, INED 102, 105, 106, 203, 205, or 208.

405, 605 Course Organization and Evaluation 3(3,0) Problems, techniques and procedures in the preparation, selection and organization of subject matter for instructional purposes. Methods, techniques and preparation of materials used in the evaluation of student achievement in industrial education subjects.

407, 607 Architectural Drafting for Industrial Education 3(1,6) Study of the major aspects of architectural drawing, such as plot, floor, and foundation plans; wall sections; and elevations. *Preq:* INED 106.

408, 608 Training Programs in Industry II 3(3,0) Basic concepts of supervision, administration, and management of training programs. Emphasis on determining training requirements, planning, directing, and evaluating training programs. *Preq:* INED 108, 404.

410, 610 Special Institute Course: Topics in Industrial Education 1-3(1-3,0) Subject areas organized according to institute needs. Content of the course will be planned cooperatively by the University and the school system or agency requesting the course. *Preq:* Teacher or Graduate standing.

414, 614 Electronics for Teachers 3(1,6) Principles of electronics as applied in communications and automatic controls involving transistors, integrated circuits, and other electronic devices and materials for the preparation of teachers of industrial arts and vocational-technical electricity and electronics. *Preq:* INED 208 or equivalent.

415, 615 Construction Practices 3(2,3) Study of industrial practices affecting man, materials, and equipment employed by the construction industry. Activities are directed to developing a working knowledge of construction technology and a framework for incorporating this industry into the industrial arts curriculum of the secondary school. *Preq:* INED 101 or Graduate standing.

418, 618 Technological Concepts in Manufacturing 3(2,3) This course is designed to familiarize industrial arts students with the technological concepts of management, production, and personnel practices employed in manufacturing industries. Students also will develop materials and utilize methods which will assist them in teaching concepts about manufacturing at the secondary-school level. *Preq:* INED 101 or Graduate standing.

421 Vocational Cooperative Programs 3(3,0) Study of the developments, objectives and principles of cooperative training programs. Emphasis is on the organization, promotion, and management of programs in vocational education. *Preq:* Consent of instructor.

422, 622 History and Philosophy of Industrial and Vocational Education 3(3,0) Study of industrial and vocational education programs with the intent of developing a sound individual philosophy of industrial and vocational education. General topics covered: history; local, state, and federal legislation; types of vocational-technical programs; professional organizations; manpower utilization, vocational guidance, and training; industry, labor, and school relationships.

424, 624 School Safety 3(3,0) Study of the principles of school safety emphasizing safety analyses, accident prevention, remediation of unsafe conditions, development and use of instructional materials, and school liability. *Preq:* Senior or Graduate standing in Education.

425, 625 Teaching Industrial Subjects 3(3,0) Effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines, and audio-visual aids. *Preq:* ED 335.

432, 632 Advanced Woodworking 2(1,3) Advanced consideration of machine methods and developments, materials, quality factors, and evaluation of instructional materials. *Preq:* INED 102.

435, 635 Advanced Industrial Metalworking Practices 3(2,3) Continuation of INED 203, enabling advanced studies in welding, foundry, and structural metals. A portion of the course will be devoted to studying existing metals manufacturing industries and to developing and using curriculum materials for teaching metalworking concepts. Field trips will be taken. *Preq:* INED 203.

438, 638 Advanced Machining 3(1,6) Advanced experiences in the set-up, operation and maintenance of machine tools and equipment. Project and product design. Study and reports of recent machining technological developments. *Preq:* INED 105.

441 Comprehensive Laboratory in Industrial Education 3(1,4) Course designed to develop skill in working in and the management of multiple activity programs as carried out in the industrial arts and prevocational laboratories. Opportunity is provided to develop a management plan for multiple activities in comprehensive laboratories that the student can use during the directed teaching experience. *Preq:* INED 101 and a minimum of 4 courses selected from the following: GC 104, INED 102, 105, 203, 205, 208.

442, 642 Competency Testing in Vocational Subjects 3(3,0) Study of competency testing in vocational education which includes educational objectives and measurement; construction and use of oral, objective, short answer, matching, essay, and performance tests; and treatment of test data for grade assignments and statistical analysis.

443, 643 Vocational Special Needs Education 3(3,0) Theory and practice related to serving special needs populations in vocational education including legislation, classification systems, school and community relations, career clusters and job analyses, IEPs with a vocational focus, assessment, work adjustment, and development and modification of curricula and instruction. *Preq:* Senior standing.

450 Industrial Cooperative Experience II 1(0,3) Continuation of INED 350. Summer only. *Preq:* Senior standing, INED 350, and consent of instructor.

451 Special Projects 3(3,0) The student is assigned a project in accordance with his needs and capabilities. Projects are either experimental, theoretical or developmental and cover subjects not thoroughly covered in other courses. *Preq:* Consent of Instructor.

452, 652 Advanced Projects 1-6 The student gains depth in content by completing a project under the supervision of an instructor in one of the following subject areas: Arts and Crafts, Drawing and Design, Electricity and Electronics, Graphic Arts, Metalworking, Occupational Education, Power, and Woodworking. *Preq:* Consent of instructor.

460, 660 Career Education 3(3,0) Introduction to the concepts and philosophical basis for career education with emphasis on the applications of career education as an integrating force within the total school curriculum. This course is designed for all students preparing to teach or those seeking to improve their teaching competencies. *Preq:* AGED 201, ED 100, INED 101, or Graduate standing.

464, 664 Still Picture Production 3(1,4) This course includes media selection, specification of learning outcomes, program planning, storyboarding, art creation and direction, photography, scripting, and audio tape production and synchronization. *Preq:* GC 104 or consent of instructor.

465, 665 Motion Picture Production 3(1,4) Study of how to produce video tape and motion picture presentations. *Preq:* INED 464 or consent of instructor.

468, 668 Advanced Power Technology—Fluid 3(2,2) Continuation of INED 205 with emphasis on transmission and control of power by means of hydraulics and pneumatics. Provides teachers with classroom opportunities to learn fundamental theory and applications of fluid power and gives hydraulic and pneumatic mechanisms used extensively in the manfacturing, construction, and transportation areas of industrial education. *Preq:* INED 205 or consent of instructor.

470, 670 Internal Combustion Engines 3(2,3) Involves study of the internal combustion engine: theory of operation, applications, methods of analyzing performance, and troubleshooting malfunctions. The course is intended as an elective for Industrial Arts and Vocational-Technical option majors who desire proficiency in this essential area of Industrial Education. *Preq:* INED 205 or consent of instructor.

480, 680 (AGED, COLED, ED) Educational Applications of Microcomputers 3(3,0) See COLED 480.

482, 682 (AGED, COLED, ED) Advanced Educational Applications of Microcomputers 3(2,2) See COLED 482

496, H496, 696 Public Relations 3(3,0) This course emphasizes the techniques and methods of effective public and industrial relations which contribute to understanding and cooperation of labor, business, professional, educational, and industrial groups.

815 Seminar in Industrial Education 1(1,0)

820 Recent Process Developments 3(3,0)

840 School Shop Design 3(3,0)

845 Needs Assessment for Education/Industry 3(3,0)

860 Instructional Materials Development 3(3,0)

861 Administration and Supervision of Vocational Education 3(3,0)

865 American Industries 3(3,0)

889 (AGED, ED) Research in Education 3(3,0)

894 Project Research 1-6(1-6,0)

895 Special Problems I 3(3,0)

896 Special Problems II 3(3,0)

INDUSTRIAL ENGINEERING (IE)

Professors: J. A. Chisman, R. P. Davis, *Head;* W. J. Kennedy, Jr., C. R. Lindenmeyer; *Associate Professor:* J. S. Greenstein; *Assistant Professor:* B. A. Watford; *Instructor:* S. C. Clark

265 Work Methods and Measurement I 3(2,3) Methods engineering and work measurement for cost control and reduction, planning, and scheduling. Graphic system representation techniques, time study, work sampling, standard data development, and predetermined basic motion time data systems are introduced.

280 Computational Methods in Industrial Engineering 2(1,3) Digital computer programming, continuing from that presented in an introductory course. Methods for solution of industrial problems requiring numerical data processing, including iterative methods and numerical optimization. Introduction to BASIC programming and microcomputer applications including development of BASIC programs for industrial engineering application, word processing, spreadsheet, and relational-data-base management programs. *Preq:* ENGR 180.

306 Manufacturing Processes 3(2,3) The basic structure of manufacturing processes, properties of engineering materials and their uses, and methods for restructuring various materials are discussed and demonstrated. *Preq:* Consent of instructor.

361 Industrial Applications of Statistics 3(3,0) Comprehensive survey of techniques from applied statistics and probability which are most applicable to modeling and problem solving in industry. Topics included are probability and statistical theory review, statistical quality control charts, acceptance sampling, curve fitting, forecasting, and reliability analysis. *Preq:* MTHSC 400 or consent of instructor.

366 Work Methods and Measurement II 3(2,3) Predetermined basic motion time data analysis of work methods for synthesis of effective work methods and standards development. Methods-Time Measurement (MTM) is presented in detail to permit application proficiency. Standard data development, using a variety of techniques is covered with emphasis on the use of stepwise multiple regression analysis. A field project is required. *Preq:* IE 265 or consent of instructor.

452, 652 Reliability Engineering 3(3,0) Probabilistic approach to assessing system reliability. Methods for analyzing serial, parallel, and complex systems include decomposition and cut-set analysis. Reliability life testing and its acceleration are covered. Essential elements of maintainability are identified and related to system availability. *Preq:* Multivariate Calculus and Introductory Statistics or consent of instructor.

465 Facilities Planning and Design 3(2,3) Study of the principles and techniques of plant layout. Quantitative techniques for facilities location and arrangement. Economic selection of materials handling equipment and integration of this equipment into the layout plan to provide effective product flow. A field project is required. *Preq:* IE 366 or consent of instructor.

466, 666 Production Systems Engineering 3(2,3) Study of methods for manufacturing operations measurement, analysis, and design. Organizational concepts, techniques for work-methods analysis and measurement, human factors, statistical quality control, and graphical techniques for facility arrangement. Not to be taken by undergraduate Industrial Engineering majors. *Preq:* MTHSC 400 or consent of instructor.

473, 673 Microcomputer Applications in Industrial Engineering 3(2,3) Introduction to microcomputer-processor fundamentals, software and hardware as these relate to Industrial Engineering applications. *Preq:* Junior standing in Industrial Engineering or consent of instructor.

480, 680 Methods of Operations Research I 3(3,0) Topics include linear programming, sensitivity analysis, the transportation model, networks, goal programming, integer programming, and dynamic programming. *Preq:* MTHSC 208 or consent of instructor.

481, 681 Methods of Operations Research II 3(3,0) Topics include decision theory, game theory, PERT-CPM, inventory models, Markovian decision processes, queueing theory, classical nonlinear optimization, and nonlinear programming. *Preq:* MTHSC 400 or consent of instructor.

482, 682 Systems Modeling 3(3,0) Modeling of discrete and continuous industrial systems using a digital computer. The purpose, theory, and techniques of systems modeling are presented. *Preq:* MTHSC 400 or consent of instructor.

483 Case Studies in Industrial Engineering 3(3,0) Actual industrial case studies will be used to strengthen the student's ability to identify problems, to select a solution procedure, and to recommend an action. *Preq:* Senior standing in Industrial Engineering.

484, 684 Engineering Economic Analysis 3(3,0) Basic principles and techniques of economic analysis of engineering projects. Consideration of time value of money, short- and long-term investments, replacement analysis, depreciation methods, cost allocation and measures of cost effectiveness. *Preq:* Senior standing in Engineering or consent of instructor.

485, 685 Industrial Systems Engineering 3(3,0) Modeling and analysis of multistage decision processes, recursive optimization, process and system design and control problems. *Preq:* IE 480.

486, 686 Production Planning and Control 3(3,0) Fundamentals underlying the determination of production capacity requirements, economic lot sizes, and the regulation of flow and storage of materials to, within, and from the production system. Elements of forecasting, determination of materials requirements, scheduling, inventory control, etc. Consideration of data processing methods. *Preq:* IE 481 or consent of instructor.

488, 688 Human Factors Engineering 3(2,3) Human factors engineering as a systems design method. Industrial application of human factors data to recognize and/or measure behavioral and physical limitations, investigate deficiencies, and improve these systems based on safety, health, and worker satisfaction. *Preq:* MTHSC 401 or consent of instructor.

491 Selected Topics in Industrial Engineering 1-3(0-3,0-9) Comprehensive study of any timely or special topic in industrial engineering not included in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

495 Senior Research I 1(0,3) Course entails attendance at weekly seminar and a student project applying the principles of industrial engineering. *Preq:* Senior standing.

496 Senior Research II 1(0,3) Course entails attendance at weekly seminar and an advanced student project applying the principles of industrial engineering. *Preq:* Senior standing.

703 Engineering Project Operations 3(3,0)

803 Engineering Optimization and Applications 3(3,0)

807 Discrete Systems Simulation 3(3,0)

808 Continuous Systems Simulation 3(3,0)

860 Dynamic Programming 3(3,0)

861 Nonlinear Programming and Methods of Search 3(3,0)

865 Facility Planning and Material Handling 3(3,0)

873 Computer-Aided Manufacturing 3(2,3)

880 Advanced Methods of Operations Research 3(3,0)

884 Advanced Engineering Economic Analysis 3(3,0)

885 Design and Analysis of Simulation Models 3(3,0)

886 Operations Research in Production Control 3(3,0)

888 Applied Queuing Theory and Markov Processes 3(3,0)

890 Special Problems in Industrial Engineering 1-3(1-3,0)

891 Master's Research. Credit to be arranged.

893 Selected Topics in Industrial Engineering 1-3(1-3,0)

895 Industrial Engineering Seminar 1(1,0)

907 Production Systems Simulation 3(2,3)

991 Doctoral Research. Credit to be arranged.

INTEGRATED PEST MANAGEMENT (IPM)

401, 601 Principles of Integrated Pest Management 3(2,3) Origins, theory, and practice of integrated pest management. Relationships among crop production and protection practices are explored. Economics of various control strategies are considered. Integrated pest management field projects are studied. Conventional and integrated pest management approaches are compared. Multidisciplinary plant problem analysis is introduced. *Preq:* AGRON 407, ENT 301, PLPA 301, or consent of instructor.

700 Internship in Plant Health 1-5(0,8-40)

704 Seminar 1(1,0)

INTERNATIONAL STUDIES (IS)

201 Global Perspectives 3(3,0) Systematic and topical survey of global issues—population, food, energy, and defense—and contemporary international problems, designed to develop awareness of the interrelatedness of global concerns and everyday life.

ITALIAN (ITAL)

Professor: M. Cranston; *Associate Professor:* L. T. Perry

101, H101 Elementary Italian 4(3,1) Introductory course stressing grammar, pronunciation, oral practice, and reading skills. Attention is given to practical everyday living as well as cultural considerations.

102, H102 Elementary Italian 4(3,1) Continuation of ITAL 101. *Preq:* ITAL 101 or consent of instructor.

196 Practicum in Italian 1(0,1) On-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

201, H201 Intermediate Italian 3(3,0) Brief review of ITAL 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Italian literature in short stories and plays. *Preq:* ITAL 102.

202, H202 Intermediate Italian 3(3,0) Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Preq:* ITAL 201.

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Italian literature, languages, and culture. May be repeated for a maximum of 6 credits. *Preq:* Consent of department head.

LANGUAGE AND INTERNATIONAL TRADE (L&IT)

400 Language and International Trade Internship 3(0,40) A one-semester, full-time (or equivalent part-time) work assignment which provides the opportunity for the student to extend theoretical classroom learning through work experience in an appropriate setting. A final report is required. May be repeated for a total of 6 credits. May be taken pass/fail only. *Preq:* FR 316, GER 316, or SPAN 316 and 12 semester hours in a Language and International Trade technical option.

LATIN (LAT)

Professor: R. R. McGregor, Jr.

101 Elementary Latin 4(4,0) Course for beginners designed principally to teach the reading of the language.

102 Elementary Latin 4(4,0) Continuation of LAT 101.

201 Intermediate Latin 3(3,0) Review of the fundamental principles of grammar in conjunction with readings from the Classical period. *Preq:* LAT 102 or equivalent.

202 Intermediate Latin 3(3,0) Continuation of LAT 201 with the introduction of writings from the late Latin and Medieval periods. *Preq:* LAT 201 or equivalent.

398 Directed Reading 1-3(1-3,0) Directed study of selected works in Latin. May be repeated for a total of six semester credits. *Preq:* LAT 202 or equivalent and consent of department head.

LAW (LAW)

Professor: R. J. Staaf; *Associate Professors:* S. H. Brown, E. C. Hipp, Jr; *Lecturer:* T. M. Patrick, Jr.

312 Commercial Law 3(3,0) Introduction to business law with primary attention given to contracts, agency, and negotiable instruments. *Preq:* Junior standing.

313 Commercial Law 3(3,0) Continuation of LAW 312 with emphasis on business organization, personal and real property, estates and bankruptcy, sales and secured transactions. *Preq:* LAW 312 or consent of instructor.

322 Legal Environment of Business 3(3,0) Development of both state and national regulation of business. Attention is given to the constitutional force and limitations of power, specific areas in which governments have acted, and the regulations that have been imposed in these areas. *Preq:* Junior standing.

333 Real Estate Law 3(3,0) The nature of real property and means of acquiring rights therein: conveyance of ownership, creation and execution of deeds mortgages, etc., landlord and tenant relationships, shared ownership concepts, and government regulation.

401 Labor Law 3(3,0) Basic labor law in the National Labor Relations Act, the Taft-Hartley and Landrum-Griffin Acts. Legal problems raised by state and federal statutes such as workmen's compensation, wage and hour legislation, and equal opportunity laws. *Preq:* LAW 322, Junior standing.

LEISURE SKILLS (LS)

Professor: G. E. Howard; *Associate Professors:* J. R. Pope, Jr., C. R. White, Jr.; *Assistant Professor:* M. H. Wynn; *Lecturers:* E. L. Griffin, D. P. Pervorse; *Visiting Assistant Professor:* G. R. Boettner; *Visiting Instructor:* D. A. Dowd

110 Bowling 1(0,3) Basic instructional program on techniques of bowling.

130 Alpine Skiing 1(0,45) Basic downhill snow skiing instruction including equipment selection, safety, and maintenance; parallel turns; edging; carved and linked turns; wedeling; and safety and etiquette. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Parks, Recreation, and Tourism Management in October.)

140 Fencing 1(0,3) Individual and group instruction for beginners in the basic skills and techniques of foil fencing.

150 Beginning Swimming 1(0,3) Fundamentals of swimming and water safety.

151 Aquatic Sports and Diving 1(0,3) This course is designed to acquaint the student with various forms of aquatic sports; competitive swimming, diving and water polo.

152 Sailing 1(0,3) Basic instruction in the nomenclature, safety and rescue techniques, and skills required to skipper sailing craft. *Preq:* Basic swimming skills.

153 Beginning Canoeing 1(0,3) Basic instruction in the nomenclature, strokes, and safety techniques in canoeing. *Preq:* Basic swimming skills.

160 Beginning Tennis 1(0,3) Fundamentals course stressing rules, basic strokes and strategy, with ample opportunity for practice.

162 Handball 1(0,3) Thorough knowledge and understanding of the rules, strategy, fundamental skills, and techniques of handball for the beginning player.

163 Racquetball 1(0,3) Basic skills, knowledge of rules, and strategy, and basic strokes.

170 Beginning Golf 1(0,3) Fundamental course stressing rules, strategy, and basic strokes.

190 Modern Dance 1(0,3) Introduction to modern dance techniques with emphasis on developing the style of movement and understanding the dance art form.

230 Advanced Alpine Skiing 1(0,45) Advanced downhill snow skiing instruction in such techniques as mogul skiing, check turns, free-style, and racing. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Parks, Recreation, and Tourism Management in October.) *Preq:* LS 130 or consent of instructor.

254 Advanced Lifesaving 1(0,3) Course designed to enhance aquatic skills and to develop lifesaving techniques. It teaches progressive techniques and practice of lifesaving and water safety skills. *Preq:* Pass preliminary swim test.

255 Water Safety Instruction 1(0,3) Course teaches progressive techniques and practice of teaching swimming and lifesaving. *Preq:* LS 254.

260 Intermediate-Advanced Tennis 1(0,3) Opportunity to advance and correct mistakes in basic tennis skills. *Preq:* Basic tennis skills.

263 Intermediate Racquetball 1(0,3) Course stressing advanced skills, techniques, and strategy with ample opportunity for practice and competition. Conditioning drills and safety aspects will also be covered. *Preq:* LS 163 or consent of instructor.

LIBERAL ARTS (LA)

110, H110 Honors Seminar in the Humanities 3(3,0) Designed to enhance and enrich the offerings in the junior division honors program of the University by providing students with intellectually invigorating and challenging interdisciplinary seminars. Variable topics. May be repeated once for credit.

H111 Seminar in the Social Sciences 3(3,0) Topical Seminar designed to enhance and enrich the offerings of the University by providing students with intellectually invigorating and challenging interdisciplinary seminars. May be repeated once for credit.

MANAGEMENT (MGT)

Professors: E. E. Burch, Jr., M. D. Crino, W. H. Hendrix, J. J. Kanet, R. L. LaForge, T. L. Leap, C. W. McNichols III, W. W. Menke, M. J. Stahl, *Head;* C. H. Whitehurst, T. W. Zimmerer; *Associate Professors:* J. K. Butler, Jr., R. S. Cantrell, D. W. Grigsby, J. M. McDonald, M. A. McKnew, J. W. Patterson, D. M. Swanson; *Assistant Professors:* R. T. Barrett, J. S. Davis, R. A. Jacobs, D. M. Parks, B. A. Spencer, K. E. Stine, G. S. Taylor; *Instructors:* S. A. Schultz, A. D. Wheeler

200 Introduction to Business 3(3,0) Role of business in our society will be critically examined. The student will be exposed to a broad overview of the functions of a business. Enrollment for credit not allowed for students majoring in Accounting, Management, Financial Management, or Industrial Management.

299 Computer Utilization 1(1,0) Familiarization in the use of modern timesharing computer terminals and minicomputers. *Preq:* CPSC 120 or equivalent.

301, H301 Principles of Management 3(3,0) Management's role as a factor of economic production. Functions of management, principles of organization, and behavior in organizations.

304 Statistical Quality Control 3(3,0) Basic statistical control techniques in all areas of industry. Process capability, process control, and acceptance sampling are studied with special reference to practical applications. Emphasis is placed on the underlying statistical theory and the assumptions associated with the various procedures. *Preq:* MTHSC 203 or 301.

307, H307 Personnel Management 3(3,0) Principles, concepts, and techniques concerned with effective and efficient utilization of personnel. Emphasis on motivation, leadership, and human behavior as they relate to employer-employee relations. Topics include personnel recruitment, classification, selection, training, development, and performance evaluation. *Preq:* Junior standing.

399, H399 Management Applications of Microcomputers 2(1,3) Three aspects of microcomputer aplications are addressed: (1) analysis of the business potential of microcomputer applications, (2) use of microcomputers to reinforce material from other management courses, and (3) the microcomputer as a personal/professional support device. *Preq:* ACCT 201, MTHSC 301 or consent of instructor.

400 Management of Organizational Behavior 3(3,0) Purpose of this course is to provide the management student with a framework for understanding how behavior within business organizations is managed. Particular emphasis will be placed on integrating management theory with recent developments in the behavioral sciences with distinct management applications. Theory, research, and business applications will be considered. *Preq:* MGT 301 or 307.

402, H402, 602 Production and Operations Management I 3(3,0) Managing, planning, and controlling production and service operations with emphasis on demand forecasting, aggregate planning, production scheduling and inventory management. *Preq:* MTHSC 301 or equivalent.

403 Special Problems 1-3(1-3,0) Planning, developing, and executing a research project related to the field of management or defense studies. *Preq:* Senior standing in Industrial Management or Administrative Management.

404 Advanced Statistical Quality Control 3(3,0) Statistical control techniques as applied to all areas of quality control: process control, process capability, acceptance sampling, and economic aspects of quality decisions. Cannot be taken for credit by students required to take MGT 304. *Preq:* MGT 402 and MTHSC 301.

405, 605 Economics of Transportation 3(3,0) Topics covered include history and structure of transportation systems in the United States, the nature of transportation costs and rates, transportation systems as factors in industrial location, government policy toward transportation, and transportation and national security. *Preq:* Senior standing and consent of instructor.

406, 606 Location Economics 3(3,0) Theoretical study of the general factors which determine industrial location in a market place economy. Current literature is surveyed. A comparison of location theory and actual location patterns is stressed. *Preq:* Senior standing or consent of instructor.

407 Directed Research 1(1,0) Planning, developing, and executing a research project related to the field of management. *Preq:* Senior standing in Management or Industrial Management.

408, 608 Production and Operations Management II 3(3,0) Managing, planning, and controlling production and service operations with emphasis on design of production systems, work measurement and standards, maintaining effective operations, project management and quality control. *Preq:* MGT 402.

409, 609 (ECON) Managerial Economics 3(3,0) See ECON 409.

415, H415, 615 Business Strategy 3(3,0) Capstone course for seniors. Various methods are used in analyzing complex business problems, requiring students to integrate their knowledge of all areas of business. Student participation and written and oral communications are stressed. *Preq:* ACCT 202; ECON 211, 212; FIN 306 or 312; MGT 301; MKT 301 and Senior standing.

416, 616 Management of Human Resources 3(3,0) Recent developments in the management of human resources with emphasis on results of research into the motivation, development of potential, and full utilization of the human resources *Preq:* MGT 307 or consent of instructor.

417, 617 Logistics Management 3(3,0) Management of physical distribution and supply systems with emphasis on design concepts, cost determinants and control. *Preq:* Senior standing.

418, 618 Management Information Systems 3(3,0) Use of data processing concepts as an aid in implementing managerial functions. Electronic data processing terminology, software, hardware, computer operations and techniques, systems analysis and the principles of management information systems design and implementation are emphasized. *Preq:* CPSC 120 or equivalent *Coreq:* MGT 399.

420, 620 Defense Management 3(3,0) Examines components and budget classifications as well as organization and management systems employed in the Department of Defense. *Preq:* ECON 419 or consent of instructor

422 Small Business Management 3(3,0) Study of the management of the small independently owned and operated business. Emphasis will be placed upon analyzing new business opportunities, planning and establishing a going concern, and managing the contemporary small business. Field experience in consulting with small businesses will enhance the student's understanding of the unique opportunities and problems of small business organizations. *Preq:* ACCT 201, MGT 301, MKT 301.

423, 623 International Business Management 3(3,0) Survey of the theoretical and institutional complexities of international business operations Topics include exporting, importing, foreign investment, multinational corporations, and the international payment system. *Preq:* Senior standing.

424, 624 International Transportation and Logistics 3(3,0) Examination and analysis of international transportation systems and their logistics support systems. Topics include ocean shipping, international air transportation, port management and EEC and Soviet-block transport systems. International transport legislation and policies are also analyzed. *Preq:* Senior standing or consent of instructor

425, 625 Compensation Management 3(3,0) Examination of the compensation employees seek in exchange for their efforts and contributions. Topics include government and union influences; job content analysis, description, and evaluation; developing pay structures; measuring and paying for performance; employee benefits; administration of the compensation plan; executive, managerial, professional, and sales. *Preq:* MGT 307.

430 Senior Seminar in Management 3(3,0) Involves an indepth study of current business topics and allows the senior management student the opportunity to relate their academic studies to real-world problems. A senior paper will be required. *Preq:* Senior standing.

800 Management Gaming 1(0,3)

801 Production and Pricing Analysis 3(3,0)

802 Finance 3(3,0)

803 Operations Management 3(3,0)

804 Managerial Policy 3(3,0)

805 Advanced Quality Control 3(3,0)

807 Comparative Management Theory 3(3,0)

810 Management and the Law 3(3,0)

811 Advanced Marketing Analysis 3(3,0)

812 Transportation Planning and Policy 3(3,0)

813 Business Research 3(3,0)

815 Personnel Management 3(3,0)

816 Management of Human Resources 3(3,0)

817 Information Systems Design and Implementation 3(3,0)

818 Management Support Systems 3(3,0)

891 Master's Research. Credit to be arranged.

903 Research Issues in Material Requirements Planning 3(3,0)

904 Seminar in Current Management Topics 3(3,0)

905 Research Methods 3(3,0)

910 Seminar in Operations Management 1-3(1-3,0)

911 Seminar in Decision Theory 1-3(1-3,0)

912 Seminar in Financial Analysis 3(3,0)

913 Management Systems Analysis 3(3,0)

914 Seminar in Marketing Management 3(3,0)

915 Seminar in Business-Level Strategy (3,0)

916 Directed Readings in Management 1-3(1-3,0)

918 Seminar in Management Support Systems 3(3,0)

921 Seminar in the Science and Practice of Business and Economic Modeling 3(3,0)

950 Seminar in Corporate-Level Strategy 3(3,0)

952 Seminar in Strategy Implementation 3(3,0)

991 Doctoral Research. Credit to be arranged.

MANAGEMENT SCIENCE (MASC)

Professors: C. V. Aucoin, E. E. Burch, Jr., J. J. Kanet, R. L. LaForge, C. W. McNichols III, W. W. Menke, J. J. Stahl, *Head; Associate Professors:* R. S. Cantrell, A. F. Czajkowski, M. A. McKnew, J. W. Patterson; *Assistant Professor:* R. T. Barrett

310, H310 Introduction to Management Science 3(3,0) Quantitative methods of the management scientist with applications to business and industrial problems. Topics include regression analysis, correlation analysis, analysis of variance, sampling, and nonparametric methods. *Preq:* MTHSC 301.

311, 611 (ECON) Introduction to Econometrics 3(3,0) See ECON 311.

312 Decision Models for Management 3(3,0) Exploration of the ways in which management science decision models can help in making sound managerial decisions. Topics include decision models and decision making, deterministic modeling, probabilistic modeling, and simulation. *Preq:* CPSC 120, MTHSC 301.

413 Management Science I 3(3,0) Role and use of management science techniques in decision making in business and industry. Stochastic and deterministic models will be emphasized. Topics include linear programming, queuing, Markov chains, and simulation. *Preq:* Consent of instructor.

414 Statistical Analysis 3(3,0) Application of statistics in management decision making. Emphasis is placed on the proper design, analysis and interpretation of planned experiments. Topics include single factor through fractional factorial experiments. *Preq:* MTHSC 301 or equivalent.

806 Regional Science Methods 3(3,0)

807 (ECON) Econometric Methods I 3(3,0)

808 (ECON) Econometric Methods II 3(3,0)

810 Foundations of Management Science 3(3,0)

812 Management Science II 3(3,0)

814 Design of Experiments in Business and Management 3(3,0)

MARKETING (MKT)

Professors: R. M. Reese, R. J. Staaf, G. L. Waddle, *Head; Associate Professors:* S. H. Brown, E. C. Hipp, Jr.; *Assistant Professors:* W. F. Forrester, Jr., S. J. Grove, M. C. LaForge, J. J. McClung; *Visiting Instructor:* R. T. Heagy; *Lecturer:* T. M. Patrick, Jr

127 Introduction to Global Marketing 1(1,0) Survey of the nature of global marketing and related career opportunities Information and applications of specific relevance to the marketing of the tourism, agriculture, and textile industries will be offered. To receive credit, this course must be completed before MKT 427

301 Principles of Marketing 3(3,0) Principles and concepts involved in planning, pricing, promoting and distributing of goods and services

402, 602 Consumer Behavior 3(3,0) Examination of selected behavioral science concepts and their application to the understanding of consumer decision making Text and cases. *Preq:* MKT 301.

422, 622 Marketing for Small Business 3(3,0) Translation of the theories of marketing into practical ideas and techniques that promote successful marketing practices in small business. *Preq:* MKT 301

423, 623 Marketing Communications 3(3,0) Analysis of mass and interpersonal communications in marketing Attention is given to communications theory, advertising, sales promotion, and personal selling *Preq:* MKT 301

424, 624 Sales Management 3(3,0) This course examines the major decisions involved in developing and managing personal selling resources. *Preq:* MKT 301.

425, 625 Retail Management 3(3,0) Retailing is studied from a decision-making approach. Topics covered include target market analysis, location analysis, merchandising, human resources, pricing, and promotion. *Preq:* MKT 301

426, 626 Industrial Marketing 3(3,0) Study and analysis of the problems and approaches to the marketing of goods and services to commercial enterprises, governments, and nonprofit organizations. Emphasis is placed upon developing strategic responses to market opportunities given competitive behavior. *Preq:* MKT 301

427, 627 International Marketing 3(3,0) Study of marketing from the international point of view. Emphasis will be placed upon the necessary modification of marketing thinking and practice for foreign markets due to individual environmental differences. *Preq:* MKT 301

431, 631 Marketing Research 3(3,0) Planning, collection, processing, and utilization of information used in marketing decision making. *Preq:* MKT 301, 402.

432, 632 Quantitative Marketing Analysis 3(3,0) Quantitative techniques applied to the investigation and solution of marketing problems. Emphasis is placed on the use of decision theory, game theory, Markov chain models, sales forecasting models, sample survey design, mathematical programming, simulation models, and marketing information systems. *Preq:* MKT 301, MTHSC 203 or 301.

437, 637 Global Marketing Strategies 3(3,0) Investigation of the importance of marketing strategy planning for the global marketer. Relevant and complex factors which vary in different global environments will be identified and analyzed. *Preq:* MKT 427.

450, 650 Marketing Management 3(3,0) Application of marketing principles in the investigation and solution of marketing problems. Managerial decision areas include products development, pricing, advertising personal selling, and channels of distribution. *Preq:* MKT 301 and 6 hours of 400-level marketing courses.

495, 695 Seminar in Marketing 3(3,0) Indepth examination of timely topics in marketing. May be repeated for credit as topics vary. *Preq:* Consent of instructor.

MATERIALS ENGINEERING (MATE)

Professors: F. W. Cooke, C. C. Fain, J. G. Goree, H. J. Rack, G. C. Robinson, J. S. Wolf; *Associate Professor:* D. D. Moyle; *Assistant Professors:* J. M. Kennedy, E. C. Skaar

304 Metallographic Analysis 3(1,6) Laboratory exercises will acquaint the student with typical industrial and research metallographic techniques involving specimen preparation and scientific photography. Standard and specialized laboratory equipment will be introduced and used with emphasis on relating metallographic observations to material properties.

405, 605 Physical Metallury 3(3,0) Comprehensive treatment of electron theory, latice defects, diffusion, solutions and phase equilibria, phase transformations, creep and fracture applied to metals and simple alloys, with emphasis on structure-property relationships. *Preq:* CRE 310.

420, 620 Introduction to Mechanical Metallurgy 3(3,0) Introduction to the elastic and plastic response of metals to pressure. Topics include the mechanisms and consequences involving ductility, brittleness, crystallography, fatigue, and creep. *Preq:* CRE 310 or equivalent.

422, 622 Introduction to Chemical Metallurgy 3(3,0) Application of structural and physical chemistry concepts to metallurgical systems. Emphasis is placed upon problem solving by both numerical and graphical methods. Major topics include bonding, intermetallic compounds, solid solutions, and heterogeneous equilibria. *Preq:* CRE 310 or equivalent; CH 331.

424, 624 Introduction to Extractive Metallurgy 3(3,0) Introduction to the economics, techniques, and theory of extracting metals from their ores. Emphasis is placed upon the chemistry and mechanics of extraction through problems involving efficiencies and yields of various metallurgical processes. *Preq:* CRE 310 or equivalent. *Coreq:* CH 331.

450, 650 Special Topics in Materials Engineering 1-4(0-4,12-0) Comprehensive study of a topic of current interest in the field of materials engineering. May be taken for credit more than one time. *Preq:* Consent of instructor.

461, 661 Nonferrous Metallurgy 3(3,0) Addresses the nonferrous metals of major structural and industrial importance including aluminum, copper, nickel, and titanium-base alloys. The industrial operations of extraction, alloying and thermomechanical processing are related first to the resultant microstructures and subsequently to the engineering properties and applications of these alloys. *Preq:* CRE 310 or equivalent training.

462, 662 Ferrous Metallurgy 3(2,3) Emphasizes the industrial processing of cast irons, carbon steels and specialty steels with special regard to their response to heat treatment. The relationship between microstructure and mechanical properties is emphasized. Laboratory sections emphasize the effects of bulk and surface treatment methods upon mechanical properties. *Preq:* CRE 310 or equivalent training.

463, 663 Metallurgy of Welding and Nondestructive Testing 3(2,3) Survey of welding processes, including resistance, forge, gas, arc, thermite, ultrasonic, electron beam and laser welding with reference to metallurgical effects and materials applicability. Includes nondestructive test methods for industrial weld inspection. Laboratory determination of microstructural and stress effects induced by welding and effects on material serviceability. *Preq:* CRE 310 or equivalent.

464, 664 Industrial Corrosion of Metals 3(3,0) Emphasizes the technical aspects of corrosion as they affect various industrial and manufacturing operations. The eight basic types of metallic corrosion are identified and discussed in terms of both plant operation parameters and fundamental electrochemical cell reactions. Techniques used to control corrosion are discussed. *Preq:* CRE 310 or equivalent and a first course in thermodynamics.

465, 665 Introduction to Plastics 3(3,0) Basic polymer chemistry, structure, properties, and testing; manufacture and application of industrial plastics and elastomers. Crystalline-amorphous systems, fibers, addition and condensation polymers, block- and graft-copolymers, thermoplastics, thermosets, elastomers, catalysis, curing plasticizers, stabilizers, fire retarders, and pigments. *Preq:* CH 201, CRE 310 or equivalent.

800 Seminar in Materials Research 1(1,0)

820 Deformation Mechanisms in Solids 3(3,0)

822 Chemical Metallurgy 3(3,0)

824 Extractive Metallurgy 3(3,0)

891 Master's Research. Credit to be arranged.

MATHEMATICAL SCIENCES (MTHSC)

Professors: K. Alam, C. V. Aucoin, J. V. Brawley, Jr., E. E. Burch, Jr., F. M. Cholewinski, R. E. Fennell, J. E. Fulton, *Head;* W. R. Hare, Jr., R. E. Haymond, S. T. Hedetniemi, P. T. Holmes, R. E. Jamison, C. R. Johnson, J. W. Kenelly, R. C. Laskar, D. R. LaTorre, R. F. Ling, J. K. Luedeman, S. M. Lukawecki, T. G. Proctor, J. A. Reneke, R. D. Ringeisen, W. H. Ruckle, D. R. Shier, K. T. Wallenius, D. D. Warner; *Associate Professors:* A. K. Bose, J. R. Brannan, A. S. Cover, P. M. Dearing, Jr., J. C. Harden, Jr., J. P. Jarvis, M. M. Kostreva, W. F. Moss III, M. C. Palmer, C. B. Russell, H. F. Senter, K. Seo; *Assistant Professors:* W. P. Adams, C. R. Aucoin, G. T. Brooks, C. L. Cox, I. B. Ibrahim, J. G. LaTorre, J. R. Nedelman, J. H. Nicholson; *Instructor:* E. V. Sturgis; *Visiting Associate Professors:* J. R. Sullivan, W. R. Verry; *Visiting Assistant Professor:* M. Artzrouni; *Lecturers:* M. R. Adams, K. R. Driessel, D. T. Johnson

101 Finite Probability 3(3,0) Topics include probability, discrete random variables, and probability distributions. May not be taken by students who have successfully completed MTHSC 301. *Preq:* A satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

102 Introduction to Mathematical Analysis 3(3,0) An intuitive approach to the concepts and applications of calculus. Topics include functions and graphing, differentiation, and integration. Applications from social, biological, and management sciences are presented. Not open to those receiving credit for MTHSC 106. *Preq:* A satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

105 Algebra and Trigonometry 5(5,0) Unified course in algebra and trigonometry. Properties of real numbers, algebraic expressions, equations and inequalities, relations and functions, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and conditional equations and complex numbers. May not be taken by students who have passed MTHSC 106.

106, H106 Calculus of One Variable I 4(4,0) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential and logarithm functions. *Preq:* MTHSC 105, or a satisfactory score on the Mathematics Test, Level II (Standard) or consent of instructor.

108, H108 Calculus of One Variable II 4(4,0) Topics included are infinite series, limits, differentiation and techniques of integration. *Preq:* MTHSC 106.

109 Algebra and Trigonometry for Teachers 3(3,0) Unified course in algebra and trigonometry. Complex number system, functions, graphs, solving equations and inequalities, trigonometry, sequences, series, combinations, and permutations. A refresher course for teachers assigned to teach in a school's college preparatory program. Enrollment limited to inservice teachers.

110 Analytic Geometry for Teachers 3(3,0) Algebraic techniques applied to geometry; lines, conic sections and their graphs; transformations of coordinates; general second-degree equations; parametric equations; polar coordinates. Restricted to inservice teachers. *Preq:* MTHSC 109 or equivalent.

115 Contemporary Mathematics for Elementary School Teachers I 3(3,0) Logic, sets, and the properties of the counting numbers, numeration systems. Open only to Elementary Education majors. *Preq:* Consent of instructor.

116 Contemporary Mathematics for Elementary School Teachers II 3(3,0) Continuation of MTHSC 115. Subtraction, properties of the integers, elementary number theory, rational number system, real number system. Open only to Elementary Education majors. *Preq:* MTHSC 115 or consent of instructor.

203 Elementary Statistical Inference 3(3,0) Survey course in fundamental statistical principles with applications. Topics include estimation, test of hypothesis, regression and correlation, analysis of variance, and nonparametric statistics. May not be taken by students who have passed MTHSC 301. *Preq:* MTHSC 101.

206, H206 Calculus of Several Variables 4(4,0) Topics include real valued functions of several variables, multiple integration, differential calculus of functions of several variables, vector field theory. *Preq:* MTHSC 108.

207 Multivariable Calculus 3(3,0) Introduction to the calculus of several variables. Topics include functions of several variables, differential calculus and optimization of several variables, multiple integrals. Topics from the management sciences will be used to illustrate the above concepts. May not be taken by students who have passed MTHSC 206. *Preq:* MTHSC 102 or 106 with consent of instructor.

208, H208 Introduction to Ordinary Differential Equations 4(4,0) Introduction to the study of differential equations and their application to physical problems. Topics include exact, series, and numerical solutions; solutions by means of Laplace transforms; and solutions of systems of differential equations. *Preq:* MTHSC 206.

210 Applied Matrix Algebra 3(3,0) Introduction to the basic principles of matrix algebra with applications to the behavioral and managerial sciences. The major areas of application will include linear programming, directed graphs, and game theory. *Preq:* MTHSC 101 and 102 or 106.

215 Algebra for Elementary School Teachers 3(3,0) Linear equations and linear inequalities in one variable, functions and graphs, systems of linear equations and linear inequalities, quadratic equations, complex number system. Finite number systems, algebraic structures. Open only to Elementary Education majors. *Preq:* MTHSC 216.

216 Geometry for Elementary School Teachers 3(3,0) An informal treatment of the basic concepts of geometry. Open only to Elementary Education majors. *Preq:* MTHSC 116 or consent of instructor.

219 Introduction to Discrete Methods 3(3,0) Introduction to elementary methods of discrete mathematics with applications to computer science. Topics will include mathematical logic, methods of proof, program correctness, theory of sets, relations, functions, mathematical induction, closure operations, order relations, equivalence relations, and basic concepts of cardinal arithmetic. *Preq:* MTHSC 106 and 108.

231 Mathematics of Life Insurance 3(3,0) Introduction to the basic mathematics of finance and life insurance. Topics include compound interest, annuities certain, mortality tables, life annuities, net premiums, net level reserves, modified reserves, nonforfeiture values and dividends.

232 Actuarial Science Seminar I 1(1,0) Problem-solving seminar designed to prepare the student for the Society of Actuaries Examination I (General Mathematics). *Preq:* MTHSC 206.

250 Introduction to Mathematical Sciences 1(1,0) Lectures and discussions on the mathematical sciences disciplines: Actuarial Science, Applied Mathematics, Computing Science, Core Mathematics, Management Science, Operations Research, and Statistics. *Preq:* MTHSC 106.

301, H301 Statistical Theory and Methods I 3(3,0) Principal topics include elementary probability theory, discrete and continuous random variables, expected values, normal distribution, chi-square distribution, t-distribution, F-distribution, test of hypothesis, point and interval estimation, curve fitting. *Preq:* MTHSC 106 or 207 or 210.

308 College Geometry 3(3,0) Theorems and concepts more advanced than those of high school geometry. A treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. *Preq:* MTHSC 106.

311, H311 Linear Algebra 3(3,0) Introduction to the algebra of matrices, vector spaces, polynomials, and linear transformations. *Preq:* MTHSC 108 or consent of instructor.

360 Intermediate Mathematical Computing 3(3,0) Continuing study of mathematical computing using the FORTRAN language. Emphasis on subroutine computation with applications to problems in science and engineering. *Preq:* CPSC 110 or consent of instructor.

400, H400, 600 Theory of Probability 3(3,0) Principal topics include combinatorial theory, probability axioms, random variables, expected values; special discrete and continuous distributions, jointly distributed random variables, correlation, conditional expectation, law of large numbers, central limit theorem. *Preq:* MTHSC 206 or consent of instructor.

401, H401, 601 Statistical Methodology 3(3,0) Probability-based treatment of statistical methods. Topics include point and interval estimation, hypothesis testing, analysis of variance, regression and correlation, analysis of categorical data, and distribution-free procedures. *Preq:* MTHSC 311 and 400.

403, H403, 603 Introduction to Statistical Theory 3(3,0) Principal topics include sampling distributions, point and interval estimation, maximum likelihood estimators, method of moments, least squares estimators, tests of hypothesis, likelihood ratio methods, regression and correlation analysis, introduction to analysis of variance. *Preq:* MTHSC 400 or equivalent.

405, 605 Statistical Theory and Methods II 3(3,0) Principal topics include simple linear regression, multiple regression and correlation analysis, one-way analysis of variance, multiple comparison, multifactor analysis of variance, experimental design. Computation and interpretation of results are facilitated through use of statistical computer packages. *Preq:* MTHSC 301.

406, 606 Sampling Theory and Methods 3(3,0) Probability-based treatment of sampling methodology. Theory and application of estimation techniques will be treated, using simple and stratified random sampling, cluster sampling, and systematic sampling. *Coreq:* MTHSC 401.

407, 607 Regression and Time-Series Analysis 3(3,0) Theory and application of the regression and time series. Approaches to empirical model building and data analysis are treated. Computation and interpretation of results are facilitated through the use of interactive statistical packages. *Preq:* MTHSC 401.

408, 608 Topics in Geometry 3(3,0) Introduction to topics in special geometries which include non-Euclidean space concepts, such as projective geometry, finite geometrics, and intuitive elementary topology. A brief introduction to vector geometry. *Preq:* MTHSC 206.

412, H412, 612 Introduction to Modern Algebra 3(3,0) Introduction to the concepts of algebra. Topics included are the number system and the elementary theory of groups, rings, and fields. *Preq:* MTHSC 311.

415, H415 Introduction to Topology 3(3,0) Introduction to point set topology; Hausdorff, regular and normal spaces; metric, connected and compact spaces; continuous mappings and homeomorphisms. *Preq:* MTHSC 206.

419, H419, 619 Discrete Mathematical Structures I 3(3,0) This course applies theoretical concepts of sets, functions, binary relations, graphs, Boolean algebras, propositional logic, semigroups, groups, homomorphisms, and permutation groups to computer characterizations and design, words over a finite alphabet and concatenation, binary group codes, and other communication or computer problems. *Preq:* MTHSC 311.

420, 620 Discrete Mathematical Structures II 3(3,0) This course applies graph theory, ring and field theory, cardinality of sets, and difference equations of Nim games and other perfect information games, transport networks, shortest route problems, polynomial codes, Bose-Chandhuri-Hoquenghem codes, machine computability, mathematical linguistics, and different codes. *Preq:* MTHSC 412, 419, or consent of instructor.

425, H425 Orthogonal Functions and Boundary Value Problems 3(3,0) Continuation of MTHSC 208. Introduction to Fourier Series, numerical methods, partial differential equations, and certain special functions is given. *Preq:* MTHSC 208.

432 Actuarial Science Seminar II 1(1,0) Problem-solving seminar designed to prepare the student for the Society of Actuaries Examination 2 (probability and statistics). *Preq:* MTHSC 403 may be taken concurrently or consent of instructor.

434, 634 Advanced Engineering Mathematics 3(3,0) Fourier series, Laplace and Fourier transform and numerical methods for solving initial value and boundary-value problems in partial differential equations are developed. Applications to diffusion wave and Dirichelet problems are given. Matrix methods and special functions are utilized. *Preq:* MTHSC 208.

435, H435, 635 Complex Variables 3(3,0) Elementary functions. Differentiation and integration of analytic functions. Taylor and Laurent series. Contour integration and residue theory. Conformal mapping. Schwartz-Christoffel transformation. *Preq:* MTHSC 206.

440, H440, 640 Linear Programming 3(3,0) Introduction to linear programming, covering the simplex algorithm, duality, sensitivity analysis, network models, formulation of models, and the use of simplex codes to solve, interpret, and analyze problems. *Preq:* MTHSC 206, 311, or consent of instructor.

441, H441, 641 Introduction to Stochastic Models 3(3,0) Introductory treatment of stochastic processes, finite-state Markov chains, queueing, dynamic programming, Markov decision processes, reliability, decision analysis, and simulation. Both theory and applications will be stressed. *Preq:* MTHSC 400.

450 Introduction to Mathematical Models 3(3,0) Study of the modeling process which will include the translation of practical problems into mathematical models, the solution of the mathematical models, and the interpretation of the solution back into practical problems. Examples will be chosen from the physical, biological, social, and management sciences. *Preq:* CPSC 110, MTHSC 208. *Coreq:* MTHSC 401 or consent of instructor.

453, H453, 653 Advanced Calculus I 3(3,0) Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. *Preq:* MTHSC 206.

454, H454, 654 Advanced Calculus II 3(3,0) Continuation of MTHSC 453. Transformations, multiple integrals, line and surface integrals, infinite sequences and series, and improper integrals.

457, 657 Applied Mathematics I 3(3,0) Formulation and analysis of mathematical models of phenomena in the natural sciences. Probabilistic foundations of diffusion theory. Dimensional analysis, scaling, asymptotic series, and perturbation methods. Examples from biology, classical mechanics, and physical chemistry. *Preq:* MTHSC 425, 434 or 454.

458, 658 Applied Mathematics II 3(3,0) Continuation of MTHSC 457. *Preq:* MTHSC 457.

460, 660 Introduction to Numerical Analysis I 3(3,0) Introduction to the problems of numerical analysis emphasizing computational procedures and application. Topics include sources of error and conditioning, matrix methods, systems of linear equations, nonlinear equations, interpolation and appoximation by splines, polynominals, and trigonometric functions. *Preq:* MTHSC 206 or 207 and 360 or equivalent.

461, 661 Introduction to Numerical Analysis II 3(3,0) Continuation of MTHSC 460. Ordinary differential equations, boundary value problems, functional approximation, numerical solution of partial differential equations, and Monte Carlo techniques. *Preq:* MTHSC 208 and 460 or consent of instructor.

463, H463, 663 Mathematical Analysis I 3(3,0) Basic properties of the real number system, sequences and limits; continuous functions, uniform continuity and convergence. Integration, differentiation, functions of several real variables, implicit function theory. *Preq:* MTHSC 206.

464, H464, 664 Mathematical Analysis II 3(3,0) Continuation of MTHSC 463.

481 Seminar in Mathematics 1-3(1-3,0) Attention will be focused upon mathematical areas in which nonroutine problems can be posed with comparative ease. Emphasis will be upon independent study and student use of previously acquired mathematical skills. Open to students only by invitation for not more than three hours credit.

700 Mathematical Computer Applications for Elementary Teachers 3(3,0)

701 Number Systems for the Elementary Grades 3(3,0)

702 Number Systems for the Middle Grades 3(3,0)

703 Modern Mathematics for Elementary School Teachers—Geometry 3(3,0)

705 Modern Mathematics for Elementary School Teachers—Algebra, Probability and Statistics 3(3,0)

707 Mathematics for Middle School Teachers: Algebra 3(3,0)

709 Mathematics for Middle School Teachers: Geometry 3(3,0)

710 Elementary Calculus from an Advanced Viewpoint 3(3,0)

711 Elementary Calculus from an Advanced Viewpoint II 3(3,0)

712 Modern Algebraic Concepts 3(3,0)

715 Ordinary Differential Equations with Applications 3(3,0)

719 Discrete Mathematics 3(3,0)

721 Matrix Algebra I 3(3,0)

722 Matrix Algebra II 3(3,0)

723 Applications of Linear and Modern Algebra 3(3,0)

725 Combinatorial Mathematics for Teachers 3(3,0)

727 Analysis Concepts for Teachers I 3(3,0)

728 Analysis Concepts for Teachers II 3(3,0)

730 Modern Geometry for Teachers 3(3,0)

731 Non-Euclidean Geometry 3(3,0)

732 Projective Geometry 3(3,0)

741 Introduction to Linear Programming with Applications 3(3,0)

751 Fundamental Concepts of Calculus I 3(3,0)

761 Probability and Statistics for Teachers 3(3,0)

771 Numerical Methods in Secondary School Mathematics I 3(3,0)

772 Numerical Methods in Secondary School Mathematics II 3(3,0)

781 History of Mathematics 3(3,0)

783 Theory of Numbers 3(3,0)

791 Mathematical Problems in the Curriculum 3(3,0)

800 Probability 3(3,0)

801 General Linear Hypothesis I 3(3,0)

802 General Linear Hypothesis II 3(3,0)

803 Stochastic Processes I 3(3,0)

804 Stochastic Processes II 3(3,0)

805 Data Analysis 3(3,0)

806 Nonparametric Statistics 3(3,0)

807 Applied Multivariate Analysis 3(3,0)

808 Reliability and Life Testing 3(3,0)

809 Time-Series Analysis, Forecasting and Control 3(3,0)

810 Mathematical Programming 3(3,0)

811 Nonlinear Programming 3(3,0)

812 Linear Analysis 3(3,0)

813 Advanced Linear Programming 3(3,0)

814 Network Flows 3(3,0)

815 Data Structures 3(3,0)

816 Graph Algorithms 3(3,0)

817 Stochastic Models in Operations Research I 3(3,0)

818 Stochastic Models in Operations Research II 3(3,0)
821 Linear Analysis 3(3,0)
822 Measure and Integration 3(3,0)
823 Complex Analysis I 3(3,0)
824 Complex Analysis II 3(3,0)
825 Introduction to Dynamical Systems Theory 3(3,0)
826 Partial Differential Equations 3(3,0)
831 Fourier Series 3(3,0)
837 Calculus of Variation and Optimal Control 3(3,0)
841 Applied Mathematics I 3(3,0)
842 Applied Mathematics II 3(3,0)
850 Computational Problems in Discrete Structures 3(3,0)
851 Abstract Algebra I 3(3,0)
852 Abstract Algebra II 3(3,0)
853 Matrix Analysis 3(3,0)
854 Theory of Graphs 3(3,0)
855 Combinatorial Analysis 3(3,0)
856 Applicable Algebra 3(3,0)
861 Advanced Numerical Analysis I 3(3,0)
862 Advanced Numerical Analysis II 3(3,0)
863 Digital Models I 3(3,0)
864 Digital Models II 3(3,0)
867 Systems and Software 3(3,0)
868 Introduction to Scientific Computing 3(3,0)
881 Mathematical Statistics 3(3,0)
882 Monte Carlo Methods 3(3,0)
885 Advanced Data Analysis 3(3,0)
891 Master's Research. Credit to be arranged.
892 Master's Project Course 1(0,1)
901 Probability Theory I 3(3,0)
902 Probability Theory II 3(3,0)
907 Multivariate Analysis 3(3,0)
920 Introduction to Harmonic Analysis 3(3,0)
927 Functional Analysis I 3(3,0)
928 Functional Analysis II 3(3,0)
954 Advanced Graph Theory 3(3,0)
981 Special Topics in Mathematical Statistics 1-3(1-3,0)
982 Special Topics in Analysis 1-3(1-3,0)
983 Special Topics in Computational Analysis 3(3,0)
984 Special Topics in Applied Mathematics 1-3(1-3,0)
985 Special Topics in Algebra 1-3(1-3,0)
986 Special Topics in Convexity 1-3(1-3,0)
987 Special Topics in Numerical Processes 1-3(1-3,0)
988 Special Topics in Operations Research 1-3(1-3,0)
991 Doctoral Research. Credit to be arranged.

MECHANICAL ENGINEERING (ME)

Professors: N. R. Bauld, Jr., E. H. Bishop, W. E Castro, M. W. Dixon, J. L. Gaddis, J. G. Goree, E. H. Law, F. W. Paul, C. E Przirembel, *Head;* H. J. Rack, C. S. Rudisill, J. S. Wolf, T. Yang; *Associate Professors:* A. C. Elrod, R. S. Figliola, L. P. Golan, C. O. Huey, Jr., J. E. Jackson, Jr., J. A. Liburdy; *Assistant Professors:* M. Ahmadian, D. E Beasley, J G. Brasseur, I. Haque, G. G. Hastings, C. C. Jara-Almonte, J M. Kennedy, R. Kumar, T. Wang; *Visiting Instructor:* J F. Wiggenraad

201 Foundations of Engineering Design 2(2,0) The design process, design planning, engineering design analysis with emphasis on modern concepts and methods, design documentation, engineering professional ethics, patents, human factors, codes and standards. *Preq:* Sophomore standing. *Coreq:* EG 109.

202 Engineering Materials and Manufacturing Processes 2(2,0) Decision making in the selection of materials and processes for manufacturing products Product design principles. *Preq:* ME 201 *Coreq:* CRE 310.

208 Numerical Methods in Engineering 3(3,0) Application of undergraduate mathematics, and basic engineering principles, with an emphasis on numerical methods, in the solution of engineering problems. Problems will be drawn from dynamics, vibrations, kinematics, thermodynamics, heat transfer, fluid mechanics, electrical circuits, and other engineering fields. *Coreq:* MTHSC 208.

H300 Junior Honors Seminar 0 Designed to acquaint students enrolled in the Departmental Honors program with current research activities in the Department of Mechanical Engineering. The faculty will provide seminars where research interests are summarized. These seminars are planned to prepare students in choosing a research topic for the senior thesis. *Preq:* Departmental Honors student with Junior standing.

302 Dynamic Systems Modeling 3(3,0) Model formulation of engineering systems based on physical laws involving the storage and transfer of matter and energy Mechanical, electrical, fluid, and thermal systems are emphasized Time and frequency response methods are considered. An introduction to control system characteristics of stability and feedback. *Preq:* EM 202, MTHSC 208.

304 Heat Transfer 3(3,0) Heat conduction in the steady and transient states, free and forced convection, radiation, combined modes, boiling and condensation. Analytical and numerical solutions to engineering heat transfer problems are emphasized. *Preq:* ME 208 and 311 or equivalent, MTHSC 208.

306 Fundamentals of Machine Design 3(3,0) Introduction to failure theory, fatigue analysis, and energy methods for deflection analysis. Integration of these topics with selected portions of mechanics of materials and application of them to the design and analysis of machine elements. *Preq:* EM 304.

310 Thermodynamics and Heat Transfer 3(3,0) Introduction to thermodynamics and heat transfer for nonmajors: Properties of liquids and gases, first and second law analysis, introduction to cycles for power and refrigeration, heat flow by conduction and radiation, and convective heat flow and heat exchangers. *Preq:* Junior standing in an Engineering curriculum.

311, H311 Engineering Thermodynamics I 3(3,0) First and second laws of thermodynamics applied to engineering systems. Properties of the ideal and real gases and vapors. Processes and introduction to power and refrigeration cycles. *Preq:* MTHSC 208, PHYS 221, Junior standing.

312 Engineering Thermodynamics II 3(3,0) Continuation of ME 311. Power and refrigeration cycles, thermodynamic relations, compressibility charts, combustion, and introduction to equilibrium. *Preq:* ME 311.

313 Instrumentation and Measurements 3(2,3) Principles of measurements, instrument accuracy and performance characteristics. Modern instrumentation for measuring both static and dynamic pressure, temperature, fluid flow, speed, power, force, acceleration, etc. Uncertainty analysis, curve fitting, and technical report writing. Analog and digital computer methods for engineering experimentation. *Preq:* E&CE 307, Junior standing.

400 Senior Seminar 1(1,0) Seminars address the problems to be encountered by engineering graduates in professional practice. Invited lecturers as well as faculty provide the lectures and demonstrations. *Preq:* Senior standing.

402 Internship in Engineering Design 2(1,3) Student is given the opportunity to apply creatively his general knowledge of engineering in the solution of an open-ended design problem involving engineering systems, machines, or devices. The source of the problem is external to the university and the students' progress in its solution is monitored and evaluated by a faculty jury. *Preq:* Senior standing.

404, 604 Control Systems Design 3(3,0) Analysis and design of feedback and control systems using principles of transient response, root locus, frequency response and state variable analyses. Experimental and analytic evaluation of laboratory control systems. *Preq:* ME 302 or equivalent.

405 Kinematics and Dynamics of Machinery I 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis on the application of these analysis techniques to planar linkages. *Preq:* EM 202 and Senior standing.

407, 607 Applied Heat Transfer 3(3,0) Application oriented extension of ME 304, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with emphasis on economics and variation of operating conditions from the design point. *Preq:* ME 304 and consent of instructor.

408, 608 Numerical Methods in Engineering Analysis 3(3,0) Techniques for solving engineering problems utilizing numerical techniques and the digital computer. Polynomial interpolation formulas, numerical integration, roots of nonlinear algebraic equations, simultaneous linear equations, ordinary and partial differential equations. Simpson's rule, Gauss-Jordan, Gauss-Siedel, Newton-Raphson, Runge-Kutta, Milne, Hamming, and Crank-Nicholson methods. *Preq:* Senior standing.

410, 610 Fracture and Fatigue Control in Engineering Structures 3(3,0) Phenomena of static fracture and dynamic (fatigue) failure are investigated qualitatively and quantitatively. Design approaches for preventing these types of failures are presented, including fracture mechanics, strain-life (C-N) and stress-life (S-N) methods. *Preq:* ME 306 or equivalent.

411, 611 Gas Power Systems 3(3,0) Study of the effects of variation in specific heat, some fundamentals of compressible flow, the combustion process, and chemical dissociation. The theoretical and actual processes associated with the gas turbine, the thermal jet, the thermal rocket, and the spark ignition and compression ignition engines are analyzed. *Preq:* ME 312.

412 Introduction to Compressible Flow and Turbomachinery 3(3,0) Introductory concepts to compressible flow. Methods of treating one-dimensional gas dynamics including flow in nozzles and diffusers, normal shocks, and methods of measuring the velocity in compressible flow. Also included are theories of energy transfer and flow of compressible fluid in turbomachinery. *Preq:* EM 320, ME 312.

413 Thermal Systems Laboratory 1(0,3) Experimental investigations in such areas as internal combustion engines, air-conditioning, refrigeration, steam turbines, steam condensers, etc. *Preq:* ME 304, 312, 313.

414 Mechanical Systems Laboratory 1(0,3) Investigations of natural phenomena arising within the areas of dynamics, vibrations, and elasticity. Experiments include friction, photoelasticity, critical speed of shafts, frequency response, and others. *Preq:* EM 304, ME 313. *Coreq:* ME 405.

415, H415 Undergraduate Research 1-3 Individual research projects to be conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

418, 618 Finite Element Analysis of Mechanical Engineering Systems 3(3,0) Introduction to the finite element method. Conventional and isoparametric elements. Numerical integration. Applications to heat transfer, fluid flow, and solids. Introduction to time-dependent and nonlinear solution methods. *Preq:* Senior standing in Engineering.

420, 620 Energy Sources and Their Utilization 3(3,0) Covers the availability and use of energy sources such as fossil fuels, solar (direct and indirect) and nuclear. Addresses energy density and constraints to use (technical and economic) for each source. *Preq:* ME 312.

422, 622 Design of Gas Turbines 3(3,0) Guiding principles in gas turbine cycles are reviewed. Turbine and compressor design procedures and performance prediction for both axial and radial flow machines are presented. Methods of design of rotary heat-exchangers and retrofitting gas turbine for regenrative operation are presented. Design projects are used to illustrate the procedures. *Preq:* EM 320, Senior standing.

423, 623 Introduction to Aerodynamics 3(3,0) Basic theories of aerodynamics are presented with the purpose of accurately predicting the aerodynamic forces and moments which act on a vehicle in flight. *Preq:* EM 320, Senior standing.

425, 625 Kinematics and Dynamics of Machinery II 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis on the application of the analysis techniques to cams, gears, and other machanisms. *Preq:* ME 405.

429, 629 Thermal Environmental Control 3(3,0) Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectrical cooling systems, cryogenics, thermodynamic properties of air, psychometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. *Preq:* ME 312.

430, 630 Fluid Power — Hydraulics 3(3,0) Engineering analysis of hydraulic system components and circuits. Topics covered will include hydraulic fluids, contamination and filtering, power generators, transmission lines, control valves, and system concepts. *Preq:* EM 320.

452, 652 Safety Engineering 3(3,0) Basic principles of industrial safety, inspections for safety compliance, design codes, design of machines and industrial equipment to meet safety standards, fire protection and control, safety laws and regulations, protective equipment. *Preq:* Senior standing.

453, 653 Dynamic Performance of Vehicles 3(3,0) Introduces techniques for analyzing the dynamic behavior of vehicles. Types of vehicles to be considered will be chosen from aircraft, surface ships, automobiles and trucks, railway vehicles, and magnetically levitated vehicles. *Preq:* ME 208 and 302.

454, 654 Design of Machine Elements 3(3,0) Design of common machine elements including clutches, brakes, bearings, springs, and gears. Optimization techniques and numerical methods are employed as appropriate. *Preq:* ME 208, 306, or consent of instructor.

455, 655 Design for Computer-Automated Manufacturing 3(3,0) Concepts of product and process design for automated manufacturing are considered. Topics include product design for automated manufacturing, product design for assembly, automating parts production, computer machine automation, use of industrial robots, computer hierachy for manufacturing and control, and concepts of flexible product manufacture. *Preq:* ME 202, 306, or consent of instructor.

456, 656 Design and Application of Industrial Robots 3(3,0) Considers the mechanics and control of industrial robots and their application to manufacturing problems. Topics covered include robot geometry, kinematics, and dynamics; servomechanisms, control and process application; programming; and integration into manufacturing applications. *Preq:* ME 404 or consent of instructor.

459, 659 Materials Selection in Design 3(3,0) Introduction to the systematic materials selection process with emphasis on metallic materials for specific applications. Polymeric, ceramic, and composite materials will also be considered. Case studies will be the primary mode of instruction, supplemented with laboratory demonstrations. *Preq:* ME 306 or consent of instructor.

493, 693 Selected Topics in Mechanical Engineering 1-6 Study of topics not found in other courses. *Preq:* Consent of instructor.

701 Applications of Engineering Analysis 3(3,0)

801 Foundations of Fluid Mechanics 3(3,0)

807 Mechanical Systems 3(3,0)

810 Macroscopic Thermodynamics 3(3,0)

811 Gas Dynamics 3(3,0)

812 Experimental Methods in Thermal Science 3(2,2)

814 Concepts of Turbulent Flow 3(3,0)

815 (PHYS) Statistical Thermodynamics I 3(3,0)

816 Energy Conversion 3(3,0)

817 Combustion Theory 3(3,0)

819 Computational Methods in Thermal Sciences 3(3,0)

820 Modern Control Engineering 3(3,0)

821 Advanced Control Engineering 3(3,0)

822 Computer Control of Automated Machines 3(3,0)

830 Conduction Heat Transfer 3(3,0)

831 Convective Heat Transfer 3(3,0)

832 Radiative Heat Transfer 3(3,0)

833 Heat Transfer with Change of Phase 3(3,0)

841 Advanced Mechanical Engineering Design I 3(3,0)

842 Advanced Mechanical Engineering Design II 3(3,0)

843 Nonlinear Dynamics of Mechanical Systems 3(3,0)

844 Random Vibrations: Theory and Measurement 3(3,0)

845 Vibration of Continuous Media 3(3,0)

851 Tribology 3(3,0)

890 Engineering Project 1-3(0,3-9)

891 Master's Research. Credit to be arranged.

893 Selected Topics in Mechanical Engineering 1-6(1-6,0)

930 Advanced Topics in Heat Transfer 1-6(1-6,0)

931 Advanced Topics in Fluid Mechanics 3(3,0)

932 Advanced Topics in Thermodynamics 3(3,0)

991 Doctoral Research. Credit to be arranged.

MEDICAL TECHNOLOGY (MT)

Coordinator: M. V. Ruppert

Anderson Memorial Hospital *Adjunct Professor:* B. Woodard; *Adjunct Assistant Professor:* G. L. Huff

McLeod Regional Medical Center (Florence) *Adjunct Associate Professor:* V. Hyman; *Adjunct Assistant Professor:* J. Lewallen

101 Introduction to Medical Technology 1(1,0) Introduction to the operation and practices in a medical laboratory. This course is designed to integrate the academic year with the clinical year. Included will be lectures on current laboratory practices, a visit to a modern medical laboratory, current training of laboratory personnel and seminars on areas of specialization.

401 Immunology 3(2,4) Presents the principles of serology and immunology and the tests utilizing these principles to detect abnormalities helpful in the diagnosis of disease. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

402 Clinical Microbiology 8(4,11) Principles of microbiology: bacteriology, mycology, virology, and parasitology. Emphasis is placed on human pathogenic organisms, using both fresh and prepared organisms. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

403 Hematology and Hemostasis 5(3,7) Information on blood as a tissue, the theory of hematological and hemostasis (coagulation) tests, factors that affect test reliability. Knowledge of blood dyscraseas. Skill in the performance of hematological and hemostasis tests is emphasized and the use of automation techniques is covered. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

404 Blood Bank 4(2,6) History and principles of blood-group systems and methods of cross matching. Selection, pretesting, and bleeding of donors and processing of blood for transfusions, including component therapy. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

407 Urinalysis 2(1,3) Study of renal function together with principles of urine analysis and anatomy of the urinary system. Emphasis is placed on laboratory procedures and their utilization to detect abnormalities helpful in the diagnosis of disease. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

408 Clinical Chemistry 10(6,14) Chemical principles as applied to the analysis of biochemical substances and to physiological processes of clinical importance. Emphasis is placed on the chemistry of blood and urine. Advanced laboratory instruments, statistical analysis, and quality control concepts are covered. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

491 Special Topics in Medical Technology 2(1,4) Some or all of the following topics will be covered during the clinical experience: cell physiology, educational principles, laboratory management, scientific reports, research problems, etc. The manner in which the accredited hospital administers the special topics will vary somewhat due to the institutional differences. *Preq:* Senior standing in Medical Technology and enrollment in a clinical program.

495 Medical Technology Clinical Studies 0-17 General enrollment course for students in hospital phase. Specific medical technology credits awarded at end of clinical year. *Preq:* Senior standing in Medical Technology.

MICROBIOLOGY (MICRO)

Professors: O. W. Barnett, Jr., E. L. Kline, L. L. Larcom, J. W. Lawson, M. J. B. Paynter, *Head;* F. J. Stutzenberger; *Associate Professor:* S. S. Hayasaka; *Assistant Professors:* S. F. Barefoot, T. A. Hughes; *Adjunct Associate Professors:* R. J. Brooker, H. F. Cantrell

100 Microbes and Human Affairs 1(1,0) An explanation of the roles of microorganisms in today's world and the significance of microbes to the future of mankind.

205 Introductory Microbiology 4(3,3) Basic concepts of microbiology are introduced through classroom and laboratory experiences. Emphasis is on practical applications in various areas of importance to man. Recommended for students not majoring in a biological science. Not open to Microbiology majors. *Preq:* CH 101 and 102, BIOL 103.

305, 605 General Microbiology 4(3,3) Morphology, physiology, classification, distribution, and cultivation of microorganisms and health. *Preq:* Introductory biology, CH 101, 102, or 112.

400, 600 Public Health Microbiology 3(3,0) Epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infection, diagnostic aids, effective treatments, immunizing procedures and methods of preventing infection. *Preq:* MICRO 305.

401, H401, 601 Advanced Bacteriology 4(2,6) Metabolism, nutrition, growth, and death of bacteria; microbiological assays and industrial fermentation; emphasis on laboratory procedures for the identification of the more common taxonomic groups. *Preq:* CH 201 or 223, 227, MICRO 305.

403, 603 Marine Microbiology 3(2,3) Discussion of the microbes that inhabit the marine environment, their peculiar physiological traits, and contributions to the ecology of oceans. *Preq:* MICRO 305, Organic Chemistry.

407, H407, 607 Food and Dairy Microbiology 4(3,3) Physical-chemical factors limiting survival and growth of microorganisms during processing and manufacturing of food and dairy products. Standard methods for enumerating and identifying indicator bacteria, yeasts, molds and microbes producing food and foodborne illness. Starter cultures, fungal toxins, microbial cell injury and standards for food and dairy products. *Preq:* BIOCH 210 or CH 201 or 223, MICRO 305.

410, H410, 610 Soil Microbiology 3(2,3) Role of microorganisms in the decomposition of organic substances, transformation of nitrogen and mineral substances in the soil; interrelationships between higher plants and microorganisms; importance of microorganisms in soil fertility. *Preq:* MICRO 305.

411, H411, 611 Pathogenic Bacteriology 4(3,3) Study of pathogenic bacteria, their morphology, cultural requirements and classification; diagnostic tests, methods of differentiation, and the disease caused. *Preq:* MICRO 305.

412, H412, 612 Bacterial Physiology 4(3,3) Consideration of the cytology, physiology, metabolism, and genetics of bacteria. Included will be studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. *Preq:* CH 224, MICRO 305, one semester of biochemistry, or consent of instructor.

413, H413, 613 Industrial Microbiology 3(2,3) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation and production of single cell protein. *Preq:* MICRO 305.

414, H414, 614 Basic Immunology 3(2,3) Consideration of the nature, production, and function of basic immune responses in animals. Procedures and mechanisms of antigen-antibody and other immune reactions. *Preq:* MICRO 305, Organic Chemistry.

415, H415, 615 Microbial Genetics 4(3,3) Cytological basis of bacterial, fungal, and viral genetics; molecular aspects; mutations; mechanisms of genetic transfers; episomes and plasmids; and population changes. *Preq:* CH 224, GEN 302, MICRO 305, or consent of the department head.

416, H416, 616 Introductory Virology 3(3,0) General introduction to the field of virology, including animal, bacterial, and plant viruses. Topics will include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay and purification. *Preq:* MICRO 305.

417, H417, 617 Molecular Mechanisms of Carcinogenesis and Aging 3(3,0) Changes which occur at the cellular and subcellular levels during transformation and aging. Accumulated damage and "intrinsic clock" theories of aging; genetic and epigenetic theories of carcinogenesis; epidemiology of cancer; viral, radiation-induced and chemical carcinogenesis; the immune system and cancer. *Preq:* BIOCH 301, MICRO 305, or consent of instructor.

491 Special Problems in Microbiology 1-3(0,3-9) Research problems in the various areas of microbiology designed to introduce undergraduate students to the planning and execution of research experimentation, and the presentation of research findings.

802 Bacteriological Technic 4(2,6)

803 Special Problems in Microbiology. Credit to be arranged.

804 Current Topics in Microbiology 1(1,0)

806 Pathogenesis and Infectious Disease 3(3,0)

807 Seminar 1(1,0)

810 Recombinant DNA and Genetic Engineering in Microbes 4(2,6)

811 Bacterial Cytology and Physiology 4(4,0)

812 Bacterial Metabolism 3(3,0)

815 Advanced Microbial Genetics 3(3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

MILITARY SCIENCE (MS)

Professor: J. G. Griffin, *Head; Assistant Professors:* B. T. Brown, W. H. Christmas, Jr., W. A. Davis, P. W. Stockunas, T. T. Wall

101 Military Science (Basic) 1(1,2) This course examines the role of the Army in today's society, ranks and branches of the Army, principles and techniques of leadership, and military justice. Laboratory periods provide training in physical conditioning, mountaineering, and weapons safety and firing. One hour lecture per week; two-hour laboratory every week or equivalent.

102 Military Science (Basic) 1(1,2) Study of Army organization and doctrine with additional focus on pay and allowances, other forces, the noncommissioned officer, and fundamentals of first aid. Laboratory periods provide training in mountaineering, weapons safety and firing, and land navigation.

201 Military Science (Basic) I 1(1,2) Introductory study of U.S. Military Weapons Systems. Emphasis is on the historical and practical perspectives of current U.S. Army weaponry. Leadership laboratory provides the students practical experience in applying principles learned and experience in leadership and physical fitness.

202 Military Science (Basic) II 1(1,2) Introduction to principles of warfare and introduction to military land navigation. Leadership laboratory provides the students practical experience in applying the principles learned in class, in addition to experience in leadership and physical training.

203 Introduction to U.S. Military Equipment 1(1,1) Hands-on study of current weapons and equipment in use in the U.S. Army. Emphasis is on the mechanical functioning, maintenance, and operation of each item studied. One-hour lecture per week; two-hour laboratory every week or equivalent.

301 Military Science (Advanced) 1(1,1) Small unit tactics: Analysis of the leader's role in directing and coordinating small units in the execution of offensive and defensive tactical missions. Cadets will enroll in one three-hour enrichment elective outside their major academic discipline. Cadets will participate in leadership laboratory training throughout the school year.

302 Military Science (Advanced) 2(2,1) Organizational leadership and methods of instruction. Study of relevant theories and concepts of organizational leadership and human behavior; techniques used in planning and presenting instruction. Continuation of leadership laboratory.

401 Military Science (Advanced) 1(1,1) Study of military operations, with emphasis on small unit leadership, training, and administration. Subject matter and leadership laboratories are designed to provide requisite knowledge and experience for commissioning and initial military assignment.

402 Military Science (Advanced) 2(2,1) Continuation of MS 401, with emphasis on military justice, law of warfare, and ethics. Subject matter and leadership laboratories are designed to provide requisite knowledge and experience for commissioning and initial military assignment.

MUSIC (MUS)

Professors: J. H. Butler, *Head;* B. F. Cook; *Associate Professors:* E. A. Freeman, L. U. Harder, L. Hochheimer; *Assistant Professor:* R. E. Goodstein; *Visiting Instructor:* M. N. Jessie

151 Applied Music 1(1,0) Individual study in performance medium (voice, piano, flute, oboe, clarinet, saxophone, bassoon, cornet, trumpet, French horn, trombone, baritone, tuba, percussion). One hour-long private lesson each week, for which a minimum of four hours' practice is required. The student is guided in a continuing advance of his technical and artistic proficiency and is required to perform an appropriate solo in a student recital each semester. May be repeated for credit with departmental approval to allow for the study of differing performance media. *Preq:* Consent of instructor, based on a qualifying audition.

152 Applied Music 1(1,0) Continuation of MUS 151. *Preq:* MUS 151.

205 Music Theory 3(3,0) Terminology and notation of traditional music are reviewed, and the techniques of sight-singing and sight-reading are practiced. Harmonic practices are studied, relating to the principal diatonic triads in all inversions. *Preq:* Consent of instructor, based on musical literacy.

206 Music Theory 3(3,0) Continuation of MUS 205 with emphasis on secondary chord structure, modulation, and nondiatonic harmony. Advanced sight-singing and melodic dictation are practiced. *Preq:* MUS 205.

210 Music Appreciation: Music in the Western World 3(3,0) Designed to deepen the student's appreciation of his musical heritage through a study of the elements of the musical language and its development in Western culture.

251 Applied Music 1(1,0) Continuation of MUS 152. *Preq:* MUS 152 and consent of instructor.

252 Applied Music 1(1,0) Continuation of MUS 251. *Preq:* MUS 251.

301 Special Topics in Music Appreciation 1(1,0) Broad survey of the many and varied aspects of the field of music in terms of media, composition, and performance and ranging in style from the oldest classics to the current popular idioms. Concert attendance is required.

305 Music Theory: Advanced Harmony 3(3,0) Study of harmonic usage involving chromaticism, free dissonance and atonality. Harmonic dictation is practiced. *Preq:* MUS 206.

306 Music Theory: Form Analysis 3(3,0) Principles of formal construction in music of all periods are studied by the inductive analysis of representative works. *Preq:* MUS 206.

311 Music Appreciation: American Music 3(3,0) Music in America from 1620 to the present. Indigenous and borrowed influences will be examined.

315 Music History 3(3,0) Development of Western music from antiquity to 1750, emphasizing representative literature from various styles and periods.

316 Music History 3(3,0) Continuation of MUS 315. Music from 1750 to present.

351 Applied Music 1(1,0) Continuation of MUS 252 for exceptional students, guiding the student in interpretation of advanced solo and ensemble literature. A minimum of eight hours weekly practice is required. Student is also required to perform an appropriate solo in the student recital. *Preq:* MUS 252, recommendation by the MUS 252 professor, and audition before the music faculty of two pieces of contrasting styles.

352 Applied Music 1(1,0) Continuation of MUS 351 Student is required to present a half-recital from memory at the close of the semester. Some, but not all, of the works performed could have been studied in a previous semester. *Preq:* MUS 351 and recommendation by the MUS 351 professor.

361 Marching Band 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. Fall semester only. *Preq:* Consent of director.

362 Symphonic Band 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. Spring semester only. *Preq:* Consent of director.

363 Jazz Ensemble 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performance given periodically in addition to the minimum rehearsal time. May be repeated for credit, with a maximum of four hours' ensemble credit allowable toward a degree. *Preq:* Consent of director.

365 University Chorus 1(0,3)[1] *Ensembles:* Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances given periodically in addition to the minimum rehearsal time; may be repeated for credit, with a maximum of four hours of ensemble credit allowable toward a degree. *Preq:* Consent of director.

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[1] No more than a total of 4 semester credit hours earned in this group of courses (MUS 361, 362, 363, 365) may be used in meeting degree requirements

400 Music in the Elementary School Classroom 3(3,0) Designed to give the teacher in the elementary school a familiarity with music suitable for use with children at the elementary level. Recordings of appropriate music, preband instruments, unison and part singing will be included. No previous training in music is required.

401 Methods and Materials in Elementary School Music 3(3,0) Materials, methods and techniques in elementary school. *Preq:* MUS 400.

421 Vocal Arranging 3(3,0) Techniques of arranging for voices and accompanying instruments are studied and appropriate arrangements prepared. *Preq:* MUS 206.

422 Instrumental Arranging 3(3,0) Transpositions, characteristics and range of the instruments of the band and orchestra are studied. Techniques of arranging for small instrumental ensembles are studied and appropriate arrangements prepared. *Preq:* MUS 206.

NURSING (NURS)

Professors: M. M. Lohr, G. A. Tanner; *Associate Professors:* E. M. Baines, S. E. Barger, M. A. Kelly, C. L. Lenz, F. M. Oglesby; *Assistant Professors:* M. F. Barber, B. C. Barham, C. L. Belcher, Q. K. Branum, B. F. Campbell, M. J. Dick, J. B. Edwards, D. A. Evers, L. R. Fisher, J. H. Higgins, R. B. Hughes, G. A. Kiser-Brown, P. M. Kline, M. J. Lilley, J. A. Milstead, S. M. Oldaker, A. B. Privette, M. A. Reichenbach, E. W. Riggs, C. Y. Schwartz, R. A. Spadoni, R. Thompson, S. W. Thompson, M. A. Wetsel; *Instructors:* M. A. Bagwell, P. A. Townsend; *Lecturers:* D. L. Irvine, R. M. McDonald; *Visiting Assistant Professor:* J. A. Eggert; *Visiting Instructors:* J. L. Adams, F. K. Bailey, L. F. Downs, A. E. Gooding, C. C. Harmon, P. P. Koch, J. L. Timms

130 Introduction to Nursing 1(1,0) Introduction to the role of the professional nurse in contemporary society. Open to non-Nursing majors.

131 Introduction to Communication for Health Professionals 1(1,0) Introduction to principles of communication used by nurses and other health professionals. Open to non-Nursing majors.

210 Health Assessment 3(2,3) Introductory nursing course offers a brief overview of the nursing process and interpersonal theory/communication theory. Learning experiences include the campus nursing laboratory and clinical agencies. *Preq:* Sophomore standing.

211 Fundamental Principles of Nursing 4(2,6) Focus on basic nursing skills required to meet human needs and to help persons maintain activities of daily living. The nursing process will be utilized as the basis for providing care. *Preq:* MICRO 205, NURS 131, 210, ZOOL 222.

230 Professionalism in Nursing I 2(2,0) Analysis of the historical development of modern nursing. Consideration of nurses' professional roles in relation to health-care delivery systems, legal issues in nursing, nursing organizations, and influence of values in ethical decisions and nursing practice.

298 Health Maintenance 3(3,0) Study of good health practices. Emphasis on lifestyles and measures of health. Not open to nursing majors.

300 Seminar in Health Care Topics 1-4(1-4,0-9) Designed to provide individualized indepth study in a selected health-care area. May have a clinical component and/or special projects. Open to non-majors. *Preq:* Consent of instructor.

301, H301 Nursing Care of the Childbearing Family 4(2,6) Course focuses on health care of the childbearing family. Emphasis is placed on pathophysiological and psychosocial concepts specific to the childbearing client throughout the childbearing process. *Preq:* NURS 211, PSYCH 340, ZOOL 233.

302, H302 Nursing Care of Children 4(2,6) Course focuses on health problems of infants, children, and adolescents. Emphasis is placed on pathophysiological and psychosocial concepts related to nursing care of children in hospital settings. *Preq:* NURS 211, PSYCH 340, ZOOL 223.

303 Adult Nursing I 7(3,12) Emphasizes pathophysiological and psychosocial influences on health of adult clients. Clinical practice will focus on applying the nursing process in providing care to adult clients and/or families in the acute care setting. Pharmacotherapeutics, nutrition, client education, and discharge planning are included. *Preq:* NURS 211, ZOOL 223.

304 Pathophysiology for Health-Care Professionals 3(3,0) Focuses on disease mechanisms and recognition of the manifestations of these mechanisms in body systems. The discussion will also include pharmacologic and mechanical interventions commonly associated with specific disease processes and application to patient-care situtations. Open to nonmajors.

315, H315 The Developing Family in the Community 4(3,3) Focus on childbearing clients, infants, children, and adolescents. Major emphasis on ways in which these individuals may achieve or maintain wellness in the family, home, and community environment. Identification of appropriate nursing strategy that enhance wellness in the community. *Preq:* NURS 211, PSYCH 340, ZOOL 223.

316, H316 Adult Nursing in the Community 4(3,3) Focus on nursing care of adults in family and community settings. Nursing interventions are identified that enhance health in the adult and elderly client. Includes study of diverse life style factors leading to increased or decreased well being of the individual. *Preq:* NURS 211, PSYCH 340, SOC 311, ZOOL 223.

320 Nursing During Alterations in Life Patterns I 2(2,0) Through the Spring 1988. Course that will focus on stress in childbearing clients, infants, children, and adolescents. Major emphasis will be pathophysiological and psychosocial concepts related to nursing care of these individuals in hospital settings. *Preq:* NURS 211, PSYCH 340. *Preq or Coreq:* NURS 321, NUTR 451, SOC 311, or consent of instructor.

321, H321 Promotion of Health I 2(2,0) Focus on childbearing clients, infants, children, and adolescents. Major emphasis on ways in which these individuals may achieve or maintain wellness in the family, home, and community environment. Identification of appropriate nursing strategies that enhance wellness in the community. *Preq:* NURS 211, PSYCH 340. *Preq or Coreq:* NUTR 451, SOC 311, or consent of instructor.

322, H322 Clinical Nursing I 2(0,6) Through the Spring 1988. Explores stressors confronting the childbearing family, issues in parent-infant nursing, and the nurse's responsibility in working with individuals and families throughout the childbearing experience. *Preq or Coreq:* NURS 320 or consent of instructor.

323, H323 Clinical Nursing II 2(0,6) Through the Spring 1988. Focus on nursing care of children of all ages and their families. Emphasis on alterations in health and needs specific to children and on working with parents to facilitate recovery *Preq or Coreq:* NURS 320 or consent of instructor.

324, H324 Clinical Nursing III 1(0,3) Clinical laboratory course that will focus on the use of the nursing process with childbearing and childrearing families in the community Emphasis on optimum-level wellness. *Preq or Coreq:* NURS 321 or consent of instructor

330 Professionalism in Nursing II 2(2,0) Introduction to research in nursing. Focus on analysis of reported research and epidemiological methods in nursing. Ethical, moral, and legal issues are discussed in relation to nursing research. *Preq or Coreq:* EXST 301 or MTHSC 203, or consent of instructor.

340 Nursing During Alterations in Life Patterns II 2(2,0) Through the Spring 1988. Study of the ways in which adults interpret and cope with changes in their life patterns throughout the adult age span. Emphasis on the crisis model and crisis intervention as a way to understand and assist clients with these changes. *Preq:* NURS 211, PSYCH 340. *Preq or Coreq:* NURS 341, NUTR 451, SOC 311, or consent of instructor.

341, H341 Promotion of Health II 2(2,0) Through the Spring 1988. Focus on the ways in which adults achieve or maintain health lifestyles in family and community settings. Nursing interventions are identified that enhance wellness in the adult and elderly client. Includes study of diverse lifestyle factors leading to increased or decreased well-being of the individual. *Preq:* NURS 211, PSYCH 340. *Preq or Coreq:* NUTR 451, SOC 311, or consent of instructor.

342 Clinical Nursing IV 2(0,6) Through the Spring 1988. Emphasis on the analysis of the health problems, coping behaviors, and health needs of adults of all ages and their families. Nursing practice in medical and surgical acute-care settings. *Preq or Coreq:* NURS 340 or consent of instructor.

343, H343 Clinical Nursing V 2(0,6) Focus on application of the nursing process in the care of mentally ill adults of all ages. Emphasis on understanding the complexity of human behavior. Opportunity to develop interpersonal process skills in depth in a one-to-one relationship with a mentally ill client. *Preq or Coreq:* NURS 340 or consent of instructor.

344, H344 Clinical Nursing VI 1(0,3) Focus on the use of the nursing process with adult and elderly clients in the community. Emphasis on achieving optimum level of wellness. *Preq or Coreq:* NURS 341 or consent of instructor.

350 (PHIL) Technology and Philosophy in Nursing 3(3,0) Analysis of the influence of the increasing application of scientific technology to health-care delivery and concomitant ethical issues.

401, H401 Mental Health Nursing 4(2,6) Study of the ways in which adults interpret and cope with changes in their life patterns utilizing models of crisis intervention. Emphasis is on understanding the dynamics of human relationships as well as the therapeutic role of the nurse. *Preq:* All required 300-level nursing courses except NURS 330.

402, H402 Long-Term Nursing Care 3(1,6) Focus on concepts and issues basic to long-term care. *Preq:* All required 300-level nursing courses except NURS 330.

403, H403 Adult Nursing II 6(4,6) Pathophysiological, psychosocial, intrapersonal focus on health problems related to acute and traumatic conditions. Emphasis is on the concepts of circulation, oxygenation, homeostasis and compensation. *Preq:* All required 300-level nursing courses except NURS 330.

404, H404 Nursing Management 3(1,6) Focus on principles of management and leadership as applied to nursing. Role, health-care delivery systems, and accountability will be considered. *Preq:* All required 300-level nursing courses except NURS 330.

415, H415 Community Health Nursing 3(2,3) Consideration of health promotion activities for community and population groups with emphasis on community assessment, screening, community planning, and health teaching/counseling. *Preq:* All required 300-level nursing courses except NURS 330.

416 Complex Clinical Nursing V 1(0,3) Practice in activities related to health promotion in population groups. Laboratory settings include areas such as industries, schools, clinics, and other community agencies and organizations. *Preq or Coreq:* NURS 415 or consent of instructor.

H426 Independent Study 4(2,6) Opportunity for indepth study in an area of special interest in clinical nursing. Laboratory experience is arranged with the instructor. Specific objectives are to be developed by the student with the consent of the instructor under whom the student wishes to study. *Preq:* All 300-level nursing courses except NURS 300 and consent of instructor.

430 Professionalism in Nursing III 2(2,0) The role of the nurse as a change agent using selected leadership and nursing theories. Models for nursing-care delivery, quality assurance, and standards of nursing care are presented. *Preq:* NURS 230 and 330; MGT 307 or SOC 430 or concurrent enrollment; or consent of instructor.

431 Care of the Hospitalized Child with Long-Term Illness 4(2,6) Role of nurse in caring for the child with a long-term or terminal illness with emphasis on adaptations to meeting basic child needs. Laboratory experience in facility providing hospitalization for children. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300.

432 Nursing Care of the Person in Crisis 4(2,6) Study of the person with an emotional crisis precipitated by either a physiological or psychological problem. Various theories concerning crisis situations and the nursing interventions necessary to deal with the person in crisis are presented. Nursing laboratory experience in a variety of settings with all age groups. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300.

434 Teaching Role of Nurse Practitioner 4(2,6) Study of the nurse's role in health teaching and application of principles of health promotion, maintenance, and restoration. Student selection of a variety of health teaching situations and development of learning resources. Laboratory experience in a variety of settings with all age groups. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300.

435 Care of Individuals with Complex and Critical Illness Problems 4(2,6) Comprehensive nursing care to individuals with complex and critical illness problems. Emphasis on care of individuals with neurological, respiratory, and cardiac problems; implications for first aid and emergency care. Laboratory experience in acute-care facilities. Limited enrollment. *Preq:* NURS 450, 451, 452.

437 Introduction to School Health Nursing 4(2,6) Role of nurse in school health programs with emphasis on the health care of the school age child in his usual environment, the home and school. Laboratory experience through schools and community care facilities. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300.

438 Coordination in Nursing Care 4(2,6) This course is designed to reinforce and expand the knowledge and skills needed in the coordination of nursing care. Guided activities in planning, implementing, and evaluating skilled nursing in clinical laboratory in health-care agencies. Participation in and evaluation of activities relating to the delivery of nursing-care services are emphasized. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300. *Preq or Coreq:* MGT 307 or SOC 430, NURS 430, 460, 461, 462.

439 Nursing of the Aged 4(2,6) Designed to assist the senior student in bridging and synthesizing concepts extracted from a variety of disciplines and applying them to the nursing process in assessing, diagnosing, planning, implementing, and evaluating the care of the aged individual residing in the community. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300.

440 Nursing Care of the High-Risk Maternity Client and Her Infant 4(2,6) An indepth study of the high-risk maternity client, her family, and the high-risk infant. Laboratory in a variety of clinical settings. Limited enrollment. *Preq:* All 300-level nursing courses, except NURS 300.

441 Nursing Problems Related to Clients Coping with Cancer 4(2,6) Designed for increasing awareness and knowledge of the multidisciplinary approaches in oncology and the role of the oncology nurse specialist, and to form a basis for viewing cancer problems within a framework for nursing research. Clinical focus is on the assistance indicated for individuals with cancer and their families. Limited enrollment. *Preq:* NURS 450, 451, 452.

442 Nursing in Community Health Settings 4(2,6) Provides opportunity for application of the nursing process with clients in various community settings. Consideration will be given to principles of management and leadership, planning care for given population groups, and nursing roles in specialized areas. *Preq:* NURS 415, 416.

443 Occupational Health Nursing 4(2,6) An indepth study of the role of the occupational health nurse with emphasis on health and safety risks in the workplace, screening, prevention, and wellness. *Preq:* All 300-level nursing courses except NURS 300.

444 Women's Health 4(2,6) Directed study of women's health concepts and issues. Classroom and clinical laboratory activities focus on health-care problems specific to women through the life span. *Preq:* All 300-level nursing courses except 300.

450 Complex Nursing Intervention I 2(2,0) Through the Spring 1988. Pathophysiological, psychosocial intra-interpersonal focus on health problems related to acute and traumatic conditions. Emphasis is on the concepts of circulation, oxygenation, cellular dysfunction, and pain. *Preq:* All 300-level nursing courses except NURS 300 and 330, or consent of instructor.

451 Complex Clinical Nursing I 2(0,6) Through the Spring 1988. Clinical practice within an acute-care setting which allows the student to apply the nursing process in giving care to clients and/or families who are experiencing problems with pain and/or cellular dysfunction. Pharmacotherapeutics, nutrition, and discharge planning are considered. *Preq or Coreq:* NURS 450 or consent of instructor.

452 Complex Clinical Nursing II 2(0,6) Through the Spring 1988. Clinical practice within the acute-care setting which provides experiences in assisting clients with health problems arising from alterations in circulation and oxygenation. Emphasis on utilization of nursing diagnoses within the trauma care-environment. *Preq or Coreq:* NURS 450 or consent of instructor.

460 Complex Nursing Intervention II 2(2,0) Through the Spring 1988. Focus on health problems related to the need for external support or long-term rehabilitation. Consideration of homeostasis and compensation, sexuality, mobility, and ethics as they relate to life support. *Preq:* All 300-level nursing courses except NURS 300 and 330. *Preq or Coreq:* MGT 307 or SOC 430; or consent of instructor.

461 Complex Clinical Nursing III 2(0,6) Through the Spring 1988. Clinical practice in the acute-care setting to assist clients and/or families with health problems arising from the need for external support to maintain health. Consideration of pharmacological and mechanical support interventions. *Preq or Coreq:* NURS 460 or consent of instructor.

462 Complex Clinical Nursing IV 2(0,6) Through the Spring 1988. Clinical practice in assisting clients and/or families with health problems requiring alternative methods for achieving activities of daily living. Participation with interdisciplinary health team. *Preq or Coreq:* NURS 460 or consent of instructor.

470 Intensive Care Nursing of the Homebound Client 4(2,6) Focus on health problems of the critically ill client in the home. Considerations of high-tech nursing care, family support and health-care financing as they relate to the needs of the critically ill homebound client. *Coreq:* NURS 450, 460, or consent of instructor.

801 Family Health Nursing 3(1,6)

804 Nursing Theory 3(3,0)

807 Nursing Research 3(3,0)

812 The Dynamics of Community Health 3(3,0)

815 The Promotion and Maintenance of Family Health 3(1,6)

825 Theories and Models of Nursing Management 3(3,0)

826 Management of Nursing Services 3(2,3)

827 Foundations of Nursing Education 3(3,0)

828 The College Teacher of Nursing 3(2,3)

831 Adult Nursing I 6(3,9)

832 Adult Nursing II 6(3,9)

833 Rehabilitative Nursing I 6(3,9)

834 Rehabilitative Nursing II 6(3,9)

835 Child Health Nursing I 6(3,9)

836 Child Health Nursing II 6(3,9)

837 Maternal-Infant Nursing I 6(3,9)

838 Maternal-Infant Nursing II 6(3,9)

840 Gerontic Nursing I 6(3,9)

841 Gerontic Nursing II 6(3,9)

843 Occupational Health Nursing I 6(3,9)

844 Occupational Health Nursing II 6(3,9)

879 Special Topics in Nursing 1-3(1-3,0-9)

889 Special Problems in Nursing 1-6(1-6,0)

891 Master's Research. Credit to be arranged.

NUTRITION (NUTR)

(See also courses listed under Animal Science, Biochemistry, Dairy Science, Food Science, and Poultry Science)

Professors: J. C. Acton, B. D. Barnett, R. F. Borgman, D. L. Cross, R. J. Davis, R. L. Edwards, D. M. Henricks, L. W. Hudson, B. F. Jenny, J. E. Jones, F. E. Pardue, G. C. Skelley, Jr., D. E. Turk, W. P. Williams, Jr.; *Associate Professors:* A. B. Bodine II, J. A. Collins, D. L. Handlin, M. E. Kunkel, J. C. McConnell, Jr., D. V. Maurice, E. L. Nichols; *Assistant Professors:* R. H. Cox, J. C. Hoskin, E. H. Hoyle; *Visiting Professor:* G. D. O'Dell

201 Introduction to Nutrition 3(3,0)S Principles of the nutrition of domestic animals and man include sources, digestion, absorption, utilization and functions of nutrients; effects of dietary deficiencies; and nutrients required for maintenance, growth, reproduction, lactation, work, and egg-shell quality. *Preq:* BIOCH 210, CH 223, or consent of instructor

401, H401, 601 Fundamentals of Nutrition 3(3,0)F Biochemical and physiological fundamentals of nutrition applicable to domestic animals and man. Considered are digestive processes, and absorption and metabolism of carbohydrates, lipids, proteins, water, minerals and vitamins. Energy metabolism and comparative anatomy and physiology of digestive systems are discussed. *Preq:* BIOCH 210, CH 223, or consent of instructor.

425, H425, 625 Nutrition and Dietetics 3(3,0) Study of the nutritional value of foodstuffs, the influence of food preparation techniques upon these values, and the development of diets to meet human nutritional requirements. Current concepts in the formulation of therapeutic diets for the treatment of the ill will be emphasized. *Preq:* NUTR 451 or equivalent.

451, H451, 651 Human Nutrition 3(3,0) Essentials of nutrition and principle nutritional deficiency conditions. Factors affecting adequacy of dietary intake, methods of determining nutritional status, the development of nutrition standards, and recent advances in human nutrition. *Preq:* Consent of instructor

455, 655 Nutrition and Metabolism 3(3,0) Concepts of metabolism fundamental to understanding normal and therapeutic nutrition will be examined. Bioenergetics as well as metabolism of carbohydrates, lipids, amino acids, vitamins, and minerals as they relate to nutrition will be discussed. *Preq:* NUTR 451 and BIOCH 210 or 423 or 406 or consent of instructor.

701 Therapeutic Nutrition 3(3,0)

702 Public Health Nutrition 3(3,0)

703 Nutrition Education 3(3,0)

704 Food Service Systems 3(3,0)

705 Nutrition Practicum 1-6(0,1-6)

706 Nutrition for Teachers 3(3,0)

721 Methods in Human Nutrition I 2(2,0)

722 Methods in Human Nutrition II 2(2,0)

801 Topical Problems in Nutrition 1-3

802 Special Topics in Nutrition 1-3(1-3,0-2)

808 Monogastric Nutrition 3(3,0)

809 Ruminant Nutrition 3(3,0)

811 Carbohydrate Nutrition 2(2,0)

812 Nutrition of Carbohydrates and Lipids 3(3,0)

813 Nutrition Techniques with Large Animals 2(1,3)

814 Nutrition Techniques with Laboratory Animals 2(1,3)

815 Lipid Nutrition 2(2,0)

816 Amino Acids and Protein Nutrition 2(2,0)

817 Mineral Nutrition 2(2,0)

818 Vitamins and Minerals 4(3,3)

819 Vitamin Nutrition 2(2,0)

851 Nutrition Seminar I 1(1,0)

852 Nutrition Seminar II 1(1,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

PACKAGING SCIENCE (PKGSC)

101 Packaging Orientations 1(1,0) Overview of the various principles and practices in packaging science, historical development, packaging as a career.

102 Introduction to Packaging Science 2(2,0) The functions of a package; materials, processes and technology used in package development; the relationship of packaging to the corporation, consumer, and society as a whole. *Preq:* PKGSC 101 or consent of instructor.

200 Packaging Materials and Manufacturing 2(2,0) Detailed study of packaging materials including glass, metal, metal foils and sheets, wood, paper, paperboard, plastics, composites, adhesives, coatings, cushioning media; their functional properties in packaging application; and laminating and combining of different packaging materials. *Preq:* PKGSC 102 or consent of instructor.

204 Container Systems (Rigid and Flexible) 2(2,0) Examination of all the packages and containers used to develop systems to distribute products to the ultimate consumer. Compatibility of product and package, structural design, costs and merchandising considerations are stressed. *Preq:* PKGSC 200 or consent of instructor.

206 Container Systems Laboratory 1(0,3) Laboratory practice in sample making, designing and constructing various containers. *Preq:* PKGSC 204 or concurrent enrollment in PKGSC 204.

368 Packaging and Society 3(3,0) Study of the role of packaging in modern-day society. Responsibilities of the packager to protect people and the environment. Package guidelines recommended by civilian and governmental agencies. *Preq:* PKGSC 102 or consent of instructor.

401 Packaging Machinery 3(3,0) A systematic study of machinery used to form, fill, seal, laminate, combine and print continuous and automated packaging lines and auxiliary material handling equipment, including principles of machine design, operation, selection, and specification. *Preq:* PHYS 207, PKGSC 204, or consent of instructor.

404 Mechanical Properties of Materials and Principles of Package Evaluation 4(4,0) Study of the properties of packaging materials, principles and standard methods (ASTM, TAPPI) of determining these properties. Evaluation of functional properties of packages including study of shock and vibration isolation. *Preq:* PHYS 207, PKGSC 200, 206 or consent of instructor.

420 Package Design and Development 3(3,0) Relationship between packaging and the marketing of consumer goods. Study of the various principles and methods practiced in developing packages, methods used to coordinate package development activities including interfacing with product development, manufacturing, marketing, and purchasing. *Preq:* PHYS 207, PKGSC 404, or consent of instructor.

454 Package Evaluation Laboratory 2(0,6) Laboratory experiments to determine properties or packaging materials and to evaluate the performance of packages including shipping test (shocks and vibration). Student learns how to operate standard testing apparatus and become familiar with industry-recognized test methods and standards. *Preq:* PKGSC 404 or consent of instructor.

PARKS, RECREATION, AND TOURISM MANAGEMENT (PRTM)

Professors: R. H. Becker, H. Brantley, *Head;* L. W. Gahan, G. E. Howard, R. W. McLellan, J. L. Stevenson; *Associate Professors:* G. W. Burnett, R. A. Conover, Jr., H. J. Grove, R. L. Howell, A. E. James, F. A. McGuire, B. J. Mihalik, J. R. Pope, Jr., B. E. Trent, C. R. White, Jr.; *Assistant Professors:* C. D. McDonald, T. D. Potts, M. Uysal, M. H. Wynn; *Lecturer:* D. P. Pervorse; *Visiting Assistant Professor:* M. K. McLellan

101 Introduction to Leisure Services 3(3,0) Introduces recreation professions and organizations: government, voluntary, and commercial. Overviews professional preparation. Outlines development of man's uses of leisure and evolution of recreation, city parks, natural resources conservation and preservation movements as philosophical forces affecting leisure services.

102 Issues in Leisure Services 3(3,0) Considers current trends, problems, laws, and issues affected by and/or affecting recreation in America.

203 Personal and Community Health 3(3,0) Course deals with health problems, disease prevention and control, school health practices, public health administration, and other health information which may enable one to live intelligently in today's complex society.

204 Sports in Recreation 3(2,3) Administrative and supervisory skills indigenous to public and/or private agency athletic programs are considered. Group instruction is given to individual and team sports, and officiating techniques applicable to these sports are taught.

205 Leisure Programs I 3(2,3) Principles and methods of program development. Time and facility utilization for sports activities, social functions, arts and crafts, outdoor activities, hobbies or special-interest groups, and activites in the cultural and performing arts will be pursued. *Preq:* PRTM 101

206 Leisure Programs II 1(0,3) Provides the opportunity for a student to conduct a recreation program in a supervised setting. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken on a Pass-Fail basis only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

207 Leisure Programs III 1(0,3) Continuation of PRTM 206. Experience will be gained in a leisure situation different from the PRTM 206 exposure. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken on a Pass-Fail basis only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

209 (FOR) Forest and Recreation Resources Application of the Microcomputer 3(2,3) Undergraduate students in Parks, Recreation, and Tourism Management will become familiar with microcomputers and software packages: word processing, spreadsheet, database management, and presentation graphics. *Preq:* CPSC 120 and Forestry or Parks, Recreation, and Tourism major.

301 Recreation and Society 3(3,0) The role of recreation in a technological and work-oriented society is investigated. Particular emphasis will be placed on recreation behavior, resources, and programming in public and private organizations which serve the public wants. Not open to students who have completed PRTM 101 and 102.

302 Camp Organization and Administration 3(2,3) Surveys the development and trends of camping in America. Considers programming for the operations of agency and private camps. Enables students to master the techniques of group living. Laboratory offers practical experience in camp craft including trips and outdoor cooking.

305 Safety in Recreation 3(3,0) Course includes the physiology of exercise as it relates to recreational sports and recreational activities, certification in first aid, and the beneficial effects of recreation. Safety aspects of recreational activities and risk recreation are also covered.

307 Park Maintenance and Operation 3(2,3) Maintenance techniques and materials. Job planning and scheduling problems of overuse and preventive maintenance are included.

308, H308 Leadership and Group Processes in Recreation 3(3,0) Leadership is analyzed through experience-based learning. Various styles of leadership and communication and their probable consequences are examined. Techniques for planning of large and small group meetings are considered. Examination is made of literature in the field of leadership and group processes.

311, H311 Therapeutic Recreation 3(3,0) Examination of the profession of therapeutic recreation by analyzing the history, philosophy, concepts, roles, and functions involved in the therapeutic recreation services.

320, H320 Recreation Policymaking 3(3,0) Structures and processes for public park and/or recreation policy formation in the United States.

321, H321 Recreation Administration 3(3,0) An analysis of the internal organization of a recreation department dealing with finances and accounting, records and reports, publicity and public relations, state and federal legislation, staff organization, coordination of community resources. *Preq:* Junior standing.

330, H330 Introduction to Environmental Interpretation 3(3,0) An introduction to the philosophy and principles of the art of environmental interpretation. A comprehensive survey of interpretive theory as it applies to the recreation and parks practitioner and the varying settings within the profession.

342, H342 Introduction to Tourism 3(3,0) Survey of travel and tourism in the United States with focus on terminology, demographics, financial significance, and trends.

343 Spatial Aspects of Tourist Behavior 3(3,0) Spatial patterns of national and international leisure travel destinations are explored and analyzed regarding their tourism attractiveness.

390 Special Projects in Recreation and Parks 1(1,0) Comprehensive studies and investigation of special topics not covered in other courses. Emphasis will be placed on field studies, community service and independent readings. May be repeated for a maximum of 3 credits. *Preq:* Junior standing and consent of instructor.

400, 600 Supervision of Recreation Personnel Patterns and Processes 3(3,0) A comprehensive study of the supervisory process in relation to individuals, programs, and groups in recreation agencies.

401, 601 World Geography of Recreation and Parks 3(3,0) Major international patterns in the provision and use of urban and rural park and recreation are examined.

402, 602 Campus Recreation 3(3,0) Study of the basic components required for administration of successful College Union and Intramural-Recreation Sport Programs.

403 Elements of Recreation and Park Planning 3(2,3) Basic recreation and park planning principles and processes, trends in area and facility development combine to form the basis for formulation of a relevant knowledge and philosophy of planning. *Preq:* Senior standing.

405 Field Training in Recreation 8(0,24) The student, in a ten-week program, has the opportunity to observe recreation programs in operation. The student will also have responsibilities of organizing and conducting activities under supervision. Maintenance and operation of facilities will be observed and practiced. Total of 360 hours required. To be taken Pass-Fail basis only. *Preq:* Senior standing in Parks, Recreation, and Tourism Management; grade-point ratio equivalent to Clemson University graduation requirement.

409 Methods of Recreation Research I 3(3,0) An analysis of the principle methods of recreation research, the application of descriptive statistics to recreation research, and the development of a research proposal. *Preq:* Senior standing.

410, H410 Methods of Recreation Research II 3(3,0) A continuation of PRTM 409 to include the supervised execution and reporting of the results of the research proposal developed in PRTM 409 and the application of inferential statistics to recreation research. *Preq:* PRTM 409 or consent of instructor.

411, 611 Therapeutic Recreation for Selected Populations 3(2,3) Therapeutic recreation services for the mentally retarded, aging, and incarcerated populations. Emphasis is directed to planning services appropriate to the needs of clients and to the goals of the various agencies and institutions. *Preq:* PRTM 311 or consent of instructor.

412, 612 Therapeutic Recreation and Mental Health 3(3,0) Therapeutic recreation services in mental health clinics, institutions, and outdoor settings. Review of disorders and current modes of treatment as they relate to therapeutic recreation. *Preq:* PRTM 311 or consent of instructor.

413, 613 Therapeutic Recreation for Physically Disabled 3(2,3) Examination of the potential psychological, physical, and sociological implications of disability to the individual and to the planning and direction of therapeutic recreation services. *Preq:* PRTM 311 or consent of instructor.

414, 614 (ED) Recreation and Leisure for Special Populations 3(3,0) Course designed to provide class participants with practical experience in designing recreation and leisure activities for special populations (e.g., handicapped, elderly).

421, H421, 621 Recreation Financial Resources Management 3(3,0) Analysis of recreation financial resources management. Deals with revenue sources and their allocation. *Preq:* PRTM 321 and Senior standing in Parks, Recreation, and Tourism Management.

431, 631 Methods of Environmental Interpretation 3(2,3) Practice and instruction in the use of equipment and methods available to the interpreter in public contact work. Coaching in presentation and evaluation of live programs and in design, execution, and evaluation of mediated programs will be the major emphasis. Programs will be delivered to public audiences in the Clemson area. *Preq:* PRTM 330, Senior standing in Parks, Recreation, and Tourism Management, or consent of instructor

432, 632 Historic Site Interpretation 3(3,0) The development and implementation of the specialized interpretive programs required at historic sites. An overview of the historic movement in the United States and its presentation to the American people. *Preq:* PRTM 330.

433, 633 Introduction to Museology 3(2,3) An introduction to the museum concept with insight into current museum practices. Course will include principles and methods of museum practice including conservation/restoration techniques. *Preq:* PRTM 330.

441, 641 Commercial Recreation 3(3,0) Components of offering leisure services and products to the public by individuals, partnerships, and corporations for the purpose of making a profit.

443, 643 Resorts in National and International Tourism 3(3,0) A variety of resort types are studied with respect to their development, organization, visitor characteristics, and environmental consequences. A case-study approach is used.

444, 644 Tour Planning and Operations 3(3,0) Provides the opportunity to understand the psychology of touring, with emphasis on packaged and group tours, and how tours of different types and scale are planned, organized, marketed, and operated. *Preq:* PRTM 342 or consent of instructor.

445, 645 Conference/Convention Planning and Management 3(3,0) Provides the opportunity to understand the problems of and solutions to conference and convention planning and management from both the sponsoring organization and facility manager's perspectives.

446, 646 Community Tourism Development 1-3(1-3,0) Provides a community-based perspective of the organizational, planning, development, funding, and operational needs for a successful tourism economy at the local level. *Preq:* PRTM 342 or consent of instructor.

447, 647 Perspectives on International Travel 3(3,0) Using the U.S. as a destination, international travel patterns and major attractions are presented. Factors which restrain foreign travel to the U.S. are analyzed. *Preq:* Senior standing and reading knowledge of a foreign language or consent of instructor

702 Group Processes in Leisure Services 3(3,0)

703 Seminar in Recreation and Park Administration 3(3,0)

704 Comprehensive Recreation Planning 3(3,0)

705 Internship 1-3(0,9)

706 Computer Assisted Administration in Leisure Services 3(2,3)

707 Principles of Environmental Interpretation 3(3,0)

708 Selected Topics 1-3(1-3,0)

709 Special Problems 1-3(1-3,0)

710 Current Issues in Recreation 1(1,0)

801 Philosophical Foundations of Recreation and Park Administration 3(3,0)

805 Recreational Aspects of Water Resources 3(3,0)

806 Urban Recreation Analysis 3(3,0)

811 Research and Evaluation in Recreation 3(3,0)

812 Leisure Services for the Elderly 3(3,0)

815 Therapeutic Recreation and Activity Therapy Administration 3(3,0)

820 Recreation Resource Policy Issues and Processes 3(3,0)

840 Tourism Policy 3(3,0)

841 Seminar in Exposition Management 3(3,0)

891 Master's Research. Credit to be arranged.

910 Research Seminar 1(1,0)

991 Doctoral Research. Credit to be arranged.

PHILOSOPHY (PHIL)

Assistant Professors: J. L. McCollough, W. A. Maker, S. A. Satris, D. E. Wueste

101 Introduction to Philosophic Problems 3(3,0) A discussion of representative philosophical questions which arise from human thought and action. Characteristic topics are as follows: The Conditions of Knowledge; The Nature of Man; The Individual and Society.

102 Introduction to Logic 3(3,0) An introduction to methods of evaluating arguments. Simple valid argument forms are given which can be joined together to produce the logical form of virtually any argument. Informal fallacies may also be considered.

103 Introduction to Ethics 3(3,0) Philosophical consideration of the nature of ethics, basic ethical issues, and problems and modes of ethical reasoning.

303 Philosophy of Religion 3(3,0) A critical consideration of the meaning and justification of religious beliefs. Representative topics are as follows: The Nature and Existence of God; Religious Knowledge; Religious Language; The Problem of Evil.

304 Moral Philosophy 3(3,0) A study of moral problems, their origin in conflicts between duty and desire, and alternative solutions proposed by classical and contemporary writers.

315 Roots of Western Philosophy 3(3,0) The origins and development of rationality as found in the thought of selected philosophers, such as Socrates, Plato, Aristotle, Augustine, and Aquinas.

316 Modern Philosophy 3(3,0) The development of the modern view as seen in major Western philosophers of the 16th, 17th, and 18th centuries. The thought of Descartes, Spinoza, Leibniz, Berkeley, and Hume may be considered to illustrate the development of rationalism and empiricism.

317 Nineteenth Century Philosophy 3(3,0) The development of 19th century philosophy with emphasis on selected works of philosophers such as Kant, Hegel, Marx, Nietzsche, and Kierkegaard.

318 Contemporary Philosophy 3(3,0) A study of the dominant movements in Western philosophy today, particularly existentialism and analytical philosophy. The object is to acquire sufficient background for reading current philosophical or philosophically influenced literature.

320 Social and Political Philosophy 3(3,0) A critical consideration of the views of some major philosophers on the nature of man's relation to society and the state in the context of their wider philosophical (logical, epistemological, metaphysical, and ethical) doctrines. Philosophers examined may include Plato, Aristotle, Augustine, Hobbes, Rousseau, Mill, Marx, Hegel, Rawls, and Nozick.

324 Philosophy of Technology 3(3,0) This course will examine technology and representative philosophical assessments of it with a focus on understanding its impact on the human condition.

325 Philosophy of Science 3(3,0) A philosophical study of problems generated by science, but which are not themselves scientific, such as what comprises a scientific theory, how scientists formulate theories and acquire knowledge, what if anything differentiates science from other ways of knowing what role concepts play in scientific knowledge, and whether scientific progress is rational.

343 Philosophy of Law 3(3,0) Explanation of the nature of legal theory and the law through a critical examination of the basic concepts and principles of these fields.

344 Business Ethics 3(3,0) Study of ethical issues created by business activities, relating them to fundamental questions of ethics generally. Representative topics: hiring, firing, promotions, business and minority, organizational influence in private lives, consumer interests, economic justice, and reindustrialization.

345 Environmental Ethics 3(3,0) Study of ethical problems in our dealings with the rest of nature, and of how they relate to ethics in general. Representative topics: the basis of ethics, nature and intrinsic value, duties to future generations, economics and the environment, rare species, animal rights, ethics and agriculture, energy doctrine.

350 (NURS) Technology and Philosophy in Nursing 3(3,0) See NURS 350.

360 Symbolic Logic 3(3,0) Introduction to the basic concepts of modern symbolic logic, including the symbolization of statements and arguments and the techniques of formal proof *Preq:* Junior standing or consent of instructor

401, 601 Studies in the History of Philosophy 3(3,0) Indepth study of a selected philosopher, philosophical school, or movement. Topics will vary. With departmental consent may be repeated one time for credit. *Preq:* Consent of instructor.

402, 602 Topics in Philosophy 3(3,0) A thorough examination of a particular philosophical topic, issue, or problem. Topics will vary. With departmental consent may be repeated one time for credit. *Preq:* Consent of instructor.

499 Independent Study 1-3(1-3,0) Course of study designed by the student in consultation with a faculty member who agrees to provide guidance, discussion and evaluation of the project. The student must select and confer with the faculty member early enough for their plan to be approved by the department head prior to registration. *Preq:* Consent of instructor.

PHYSICS (PHYS)

Professors: B. B. Bookmeyer, P. B. Burt, R. L. Chaplin, Jr., W. E. Gettys, H. W. Graben, F. J. Keller, L. L. Larcom, A. L. Lasker, J. P. McKelvey, J. R. Manson, D. P. Miller, M. G. Miller, J. R. Ray, M. D. Sherrill, M. J. Skove, E. P. Stillwell, Jr., R. C. Turner, C. W. Ulbrich, *Acting Head;* H. E. Vogel; *Associate Professors:* T. F. Collins, P. J. Flower, J. A. Gilreath, M. F. Larsen, P. A. Steiner; *Visiting Assistant Professor:* K. V. Reddy

101 Current Topics in Modern Physics 1(0,2) Demonstrations and lectures serving as an introduction to different areas of physics and astronomy will be presented by various members of the staff. These areas may include such topics as astrophysics, energy, relativity, and weather, as well as visits to the planetarium.

122, H122 Physics with Calculus I 3(3,0)[1] The first of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. *Coreq:* MTHSC 108.

124 Physics Laboratory I 1(0,3) Introduction to physical experimentation with emphasis on mechanical systems, including oscillatory motion and resonance. Computers are used in the experimental measurements and in the statistical treatment of data. *Coreq:* PHYS 122.

200 Introductory Physics 4(3,2)[1] Introduction to classical physics. Includes elements of mechanics, heat, electricity, and light. This course may not be substituted for PHYS 122 but may be substituted for PHYS 207, only with the approval of the Department of Physics and Astronomy. *Coreq:* MTHSC 105 or equivalent.

207 General Physics I 4(3,2)[1] Introductory course for students who are not majoring in physical science or engineering. This course covers such topics as mechanics, waves, fluids, and heat. *Coreq:* A course including algebra and trigonometry.

208 General Physics II 4(3,2)[2] Continuation of PHYS 207. This course covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. *Preq:* PHYS 207.

221, H221 Physics with Calculus II 3(3,0)[2] Continuation of PHYS 122. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. *Preq:* PHYS 122.

222, H222 Physics with Calculus III 3(3,0) Continuation of PHYS 221. Topics include wave motion, electromagnetic waves, interference and diffraction, relativity, atomic particles, and atomic and nuclear structure. *Preq:* PHYS 221.

223 Physics Laboratory II 1(0,3) Experiments in heat and thermodynamics, electrostatics, circuits, and magnetism. Computers are used in the statistical treatment of data. *Coreq:* PHYS 221.

224 Physics Laboratory III 1(0,3) Experiments involve atomic, molecular, and nuclear systems. The wave particle dualism of light and matter is emphasized. Calculators and computers are used in statistical treatment of data. *Coreq:* PHYS 222.

240 Physics of the Weather 3(3,0) A descriptive introduction to meterology. Includes atmospheric thermodynamics, solar radiation, heat budget, atmospheric circulation, force laws governing air motion, fronts, precipitation, synoptic prediction. Special topics of current interest such as the effect of environmental pollution of weather, and the effect of weather on health are included.

245 Energy Sources for the Future 3(3,0) A study of possible sources of energy including fossil fuels, solar energy, nuclear energy, and their uses. The basic physical concepts, the economic feasibility, and environmental impact of the use of these sources of energy are discussed. *Preq:* One semester of a physical science.

262 Physics of Music 3(3,0) An elementary, nontechnical study of the relationship between the laws of physics and the production of music for the music student or layman who wishes to understand the physical principles of the art. Topics include mechanical and acoustical laws, harmonic analysis, musical scales, sound production in instruments, physiology of hearing, etc.

290 Physics Research 1-3(0,3-9) This individual research project may be performed in any area of experimental or theoretical physics or astronomy. Work will be performed under the supervision of a physics or astronomy faculty member. Project need not be original but must add to the student's ability to carry out research. May be repeated to a maximum of 6 credits. *Preq:* Consent of instructor and minimum GPR of 3.0.

321, H321, 621 Mechanics I 3(3,0) Statics, motions of particles and rigid bodies, vibratory motion, gravitation, properties of matter, flow of fluids. *Preq:* PHYS 221.

322, H322, 622 Mechanics II 3(3,0) Dynamics of particles and rigid bodies, Lagrangian and Hamiltonian formulations, vibrations of strings, wave propagation. *Preq:* PHYS 321 or consent of instructor.

[1] Credit for a degree will be given for only one of the following courses: PHYS 122, 200, 207.

[2] Credit for a degree will be given for only one of the following courses: PHYS 208, 221.

325, H325, 625 Experimental Physics I 3(1,4) Introduction to experimental modern physics, measurement of fundamental constants, repetition of crucial experiments of modern physics (Stern-Gerlach, Zeeman effect, photoelectric effect, etc.). *Coreq:* PHYS 321 or consent of instructor.

326, H326, 626 Experimental Physics II 3(1,4) Continuation of PHYS 325.

340 (E&CE) Electromagnetics I 2(2,0) See E&CE 340.

341 (E&CE) Electromagnetics II 2(2,0) See E&CE 341.

401 Senior Thesis I 1-3 A semioriginal project performed under the direction of a physics staff member. Theoretical fields available include relativity, solid state, statistical mechanics, nuclear physics, and astrophysics. Experimental work may be done in various areas of solid-state physics, astronomy, biophysics, and atmospheric physics. *Preq:* Three physics courses beyond General Physics.

402 Senior Thesis II 1-3 Continuation of PHYS 401

417, H417, 617 Introduction to Biophysics I 3(3,0) Introduction to the application of physics to biological problems. Topics include a review of elementary chemical and biological principles, physics of biological molecules, and fundamentals of radiation biophysics. *Preq:* MTHSC 206, PHYS 221, or consent of instructor.

418, H418, 618 Introduction to Biophysics II 3(3,0) Continuation of PHYS 417. Further work in radiation biophysics, cell population kinetics, and selected special topics such as membrane biophysics, control theory and molecular biophysics, muscle studies, irreversible thermodynamics in biophysics, enzyme physics, etc. *Preq:* MTHSC 206, PHYS 221, or consent of instructor.

420, 620 Atmospheric Physics 3(3,0) A study of the physical processes governing atmospheric phenomena. Topics include thermodynamics of dry and moist air, solar and terrestrial radiative processes, convection and cloud physics, precipitation processes, hydrodynamic equations of motion and large-scale motion of the atmosphere, numerical weather prediction, atmospheric electricity. *Preq:* MTHSC 108, PHYS 208 or 221.

427, 627 Instrumentation in Experimental Physics 3(2,2) Designed to introduce the student to the instrumentation techniques involved in physics research, including the interfacing of microcomputers to experimental equipment. Data acquisition and storage and the signal conditioning to accomplish these tasks are presented in a planned sequence. *Preq:* PHYS 221 and 223, or consent of instructor

432, H432, 632 Optics 3(3,0) This course covers a selection of topics, depending on the interest of the student. Topics covered may include the formation of images by lenses and mirrors, design of optical instruments, electromagnetic wave propagation, interference, diffraction, optical activity, lasers, and holography *Preq:* PHYS 221

442, H442, 642 Electromagnetic Theory 3(3,0) A study of the foundations of electromagnetic theory. Topics include electrostatics, dielectrics, magnetostatics, magnetic materials, Maxwell's equations, relativity, and electrodynamics. *Preq:* E&CE (PHYS) 341 or consent of instructor

446, H446, 646 Solid State Physics 3(3,0) An introductory treatment of the crystal structure of solids and the properties of solids which depend on crystal structure, free electron model of metals, band theory of solids, Brillouin zones, crystalline defects and diffusion. *Preq:* PHYS 222 or consent of instructor

452, H452, 652 Nuclear and Particle Physics 3(3,0) A study of our present knowledge concerning subatomic matter. The experimental results are stressed. Topics discussed include particle spectra, detection techniques, Regge pole analysis, quark models, proton structure, nuclear structure, scattering and reactions.

455, H455, 655 Quantum Physics I 3(3,0) Discussion of solution of the Schroedinger equation for free particles, the hydrogen atom and the harmonic oscillator. *Preq:* PHYS 322, E&CE (PHYS) 341, or consent of instructor.

456, H456, 656 Quantum Physics II 3(3,0) Continuation of PHYS 455. Application of principles of quantum mechanics as developed in PHYS 455 to atomic, molecular, solid state and nuclear systems. *Preq:* PHYS 455.

457, H457, 657 Basic Health and Radiological Physics I 3(3,0) Topics discussed in this course include a survey of nuclear physics, interaction of radiation with matter, biological effects of high and low energy radiation, and uses of radiation for therapy and diagnosis. *Preq:* PHYS 321, E&CE (PHYS) 341, or consent of instructor.

458, H458, 658 Basic Health and Radiological Physics II 3(3,0) Continuation of PHYS 457. Topics covered will include dosimetry and radiation protection, ultraviolet radiation effects, shielding calculations, thermal effects, tracer use and kinetics, and ultrasonics. *Preq:* PHYS 457 or equivalent.

460, H460, 660 Contemporary Physics for High School Teachers 3(3,0) Study of later developments including the measurements of atomic particles. The formulation of new laws and the modifications of old ideas needed to describe the interactions of these particles. *Preq:* One year of General Physics or consent of instructor.

465, H465, 665 Thermodynamics and Statistical Mechanics 3(3,0) Study of temperature, development of the laws of thermodynamics and their application to thermodynamic systems. An introduction to low temperature physics is given. *Preq:* Six hours of physics beyond PHYS 222 or consent of instructor.

473, H473, 673 X-Ray Crystalography 3(2,3) Study of crystal symmetry, elementary group theory, X-ray diffraction by crystals. Experimental methods of goniometry, powder and single crystal diffraction are used to determine structures and electron density distribution. Application of X-ray diffraction to chemical, physical, and metallurgical problems.

475, 675 Special Topics in Physics 1-3(0-3,0-9) Comprehensive study of a topic of current interest in the field of physics. May be taken for credit more than one time. *Preq:* Consent of instructor.

703 Modern Physics for High School Teachers 3(3,0)

711 Origins of Physical Science 3(3,0)

716 Experimental Physics for High School Teachers 4(2,4)

720 Earth Science III: Meteorology and Oceanography for Science Teachers 3(3,0)

721 Earth Science IV: Special Topics in Meteorology for Science Teachers 1(0,2)

723 Weather Science for Science Teachers 3(3,0)

731 Physics for Advanced Placement Teachers 3(2,2)

775 Physics Topics for Teachers 1-3(0-3,0-6)

811 Methods of Theoretical Physics I 3(3,0)

812 Methods of Theoretical Physics II 3(3,0)

815 (ME) Statistical Thermodynamics I 3(3,0)

816 Statistical Thermodynamics II 3(3,0)

817 Advanced Statistical Mechanics 3(3,0)

821 Classical Mechanics I 3(3,0)

822 Classical Mechanics II 3(3,0)

841 Electrodynamics I 3(3,0)

842 Electrodynamics II 3(3,0)

845 Solid State Physics I 3(3,0)

846 Solid State Physics II 3(3,0)

875 Seminar in Contemporary Physics 1-3(1-3,0)

890 Directed Activities in Applied Physics 1-6

891 Master's Research. Credit to be arranged.

951 Quantum Mechanics I 3(3,0)

952 Quantum Mechanics II 3(3,0)

966 Relativity 3(3,0)

971 Advanced Quantum Theory I 3(3,0)

972 Advanced Quantum Theory II 3(3,0)

991 Doctoral Research. Credit to be arranged.

PLANT PATHOLOGY (PLPA)

Professors: O. W. Barnett, Jr., L. W. Baxter, N. D. Camper, G. E. Carter, Jr., O. J. Dickerson, *Head;* G. C. Kingsland, S. A. Lewis, W. Witcher, E. I. Zehr; *Assistant Professor:* D. A. Kluepfel

301, H301 Plant Pathology 3(2,2)F, S Principles of the interrelationships between plant pathogens, their hosts, and the environment. Economically important plant diseases are used to illustrate these principles and the application of these principles to disease control. *Preq:* BIOL 103 and 105 or 110.

411, 611 Plant Disease Diagnosis I 2(1,2)SS, Odd-numbered years. Methods and procedures used in the diagnosis of plant diseases, especially late spring and early-summer diseases. Basic techniques of pure culture and identification of plant pathogens and Koch's postulates will be taught. Diagnosis of a wide variety of diseases of cultivated and wild plants will be carried out. *Preq:* PLPA 301 or equivalent.

412, 612 Plant Disease Diagnosis II 2(1,2)SS, Even-numbered years. Methods and procedures used in the diagnosis of plant diseases, especially late-summer diseases. Basic techniques of pure culture and identification of plant pathogens and Koch's postulates will be taught. Diagnosis of a wide variety of diseases of wild and cultivated plants. *Preq:* PLPA 301 or equivalent.

451, 651 Bacterial Plant Pathogens 3(2,3)S, Odd-numbered years. The nature, development, and control of plant diseases caused by bacteria. Taxonomic considerations, host-parasite relations and techniques used in isolating, identifying, and preserving bacterial plant pathogens. *Preq:* MICRO 305, PLPA 301, or consent of instructor.

456, H456, 656 Plant Virology 3(2,3)S, Even-numbered years. Plant viruses with emphasis on their morphology, biochemistry, purification and transmission; symptoms resulting from virus infection; virus-vector relationships; and serological procedures. The importance and control of plant virus diseases will be discussed. *Preq:* BIOL 103 and 105 and any biochemistry or plant physiology course.

458, H458, 658 Plant Parasitic Nematodes 3(2,3)F, Odd-numbered years. Morphology and taxonomy of stylet-bearing nematodes and their relationship with plant diseases. *Preq:* BIOL 103, 104, 105, 106 or 110, 111.

800 Advanced Plant Pathology 3(3,0)

801 Epidemiology and Control of Plant Disease 3(3,0)

803 Fungal Plant Pathogens 3(1,6)

804 Physiological Plant Pathology 3(3,0)

805 Special Problems in Plant Pathology. Credit to be arranged.

807 Seminar 1(1,0)

808 Techniques and Methods in Plant Pathology 1(0,3)

809 Physiological Techniques in Plant Pathology 2(1,3)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

POLITICAL SCIENCE (POSC)

Professors: H. E. Albert, E. M. Coulter, C. W. Dunn, *Head;* M. A. Morris, W. H. Owens, Jr., M. W. Slann; *Associate Professors:* H. W. Fleming, Jr., S. H. Wainscott, J. D. Woodard; *Assistant Professor:* W. Lasser; *Visiting Assistant Professor:* L. L. Duke; *Adjunct Professors:* E. E. Morris, Jr., J. S. Thurmond

101 American National Government 3(3,0) An introduction to American National Government and politics with an emphasis on the functions of governmental organizations, the behavior of political parties and personalities, and the role of public opinion.

201 Introduction to Political Science 3(3,0) A basic introduction to the study, analysis, scope, and sources of government. Emphasis is given to the comparative institutions of government, the international relations of government, the theoretical conceptions man has entertained about government, and analysis of the ways in which man has behaved in response to government.

300 Special Activities 1-3(0,1-3) Course encompasses special projects, approved by the department head, which involve students in research, simulation, internships, or other actions requiring the study and application of political principles, and which are engaged in for at least one semester or its equivalent.

302 State and Local Government 3(3,0) The structural features, functions, and legislative, executive and judicial processes of American state and local government.

321 General Public Administration 3(3,0) Introduction to public administration including the elements of organization, personnel and financial management, administrative law, and administrative responsibility. *Preq:* POSC 101 or consent of instructor.

341 Political Science Methodology 3(2,1) Introduction to political science methodology. Examination of the different research settings and various techniques for collecting political data. A critical review of the contemporary literature of political science. Laboratory training and fieldwork in interviewing. Includes exercises in computer use for elementary quantitative analysis of political data. *Preq:* MTHSC 101 and POSC 101 or the equivalent or consent of the instructor.

351 Classical Political Thought 3(3,0) Political philosophy from the pre-Socratic period to Machiavelli. *Preq:* POSC 201 or consent of instructor.

352 Modern Political Thought 3(3,0) The early theories of the nation state in the sixteenth century and the major political thinkers, problems and movements through the twentieth century. *Preq:* POSC 201 or consent of instructor.

361 International Politics 3(3,0) Introduction to foreign policy, international law, and international organizations. *Preq:* POSC 201 or consent of instructor.

371 Comparative European Politics 3(3,0) Major emphasis on the United Kingdom, France, Germany, and the U.S.S.R., with brief attention given to Italy and Switzerland. Current methods of comparison will be studied and applied to the formal and informal functioning of these governments. *Preq:* POSC 101, 201 or consent of instructor.

372 Totalitarian Political Systems 3(3,0) Continuation of POSC 371. Course will deal specifically with the Soviet Union as an example of totalitarian political systems, with references made to Nazi Germany and the present Eastern European political systems. *Preq:* POSC 201 or consent of instructor.

373 Third World Politics 3(3,0) A survey of policies and problems of development of Third World states and their implications for the United States.

379 Directed Study in Comparative and International Politics 3(3,0) Readings and research in comparative government and society and international affairs. *Preq:* Consent of instructor.

H390 Junior Honors Research 1(1,0) Readings and research in conjunction with an approved political science course at the 300 or 400 level. Honors status required.

403 American Congress 3(3,0) Examination of the behavior and processes of decision making in the American Congress together with an analysis of the interaction among Congress and the executive and judicial branches of the national government. *Preq:* POSC 101.

405 The American Presidency 3(3,0) Examination of the organizational patterns, administrative behavior, and political forces in the Presidency with considerable emphasis on relations between the Presidency and Congress, the courts, and administrative regulatory agencies. *Preq:* POSC 101, or consent of instructor.

406 American Federal System 3(3,0) Examination of the intergovernmental relationships among national, state, and local governments in the United States with an emphasis on such subjects as administrative and fiscal relations in the federal system. *Preq:* POSC 101.

409, 609 Directed Study in American Institutions 3(3,0) Supervised reading and/or research in selected areas of American government. *Preq:* Twelve semester hours in political science and consent of instructor.

422, 622 Public Policy Analysis 3(3,0) Selected views of public administration and the problems involved. *Preq:* POSC 101 or consent of instructor.

423, 623 Municipal Administration 3(3,0) Interaction of political, technical, and administrative processes in urban America. *Preq:* POSC 101 or consent of instructor.

424, 624 Administrative Law 3(3,0) Examination of the legal principles governing procedures and policy making processes of administrative agencies with emphasis upon delegation of powers, elements of fair administrative procedure, and judicial review and control of administrative determinations. *Preq:* POSC 101.

425, 625 Grants and the Governmental Budgetary Process 3(3,0) Examination of the budgetary structures and processes at the national, state, and local levels of government. Special emphasis is devoted to grantsmanship, because state and local budgets depend heavily upon grants. Each student writes a grant proposal. *Preq:* POSC 101 or consent of instructor.

427, 627 Government Personnel Administration 3(3,0) Government personnel systems; current trends and problems; essentials of recruitment, classification, compensation, motivation, evaluation, training, and discipline. *Preq:* POSC 101 or consent of instructor.

428, 628 American Defense Policy Analysis 3(3,0) A study of the problems in formulating policies of national defense, examination of alternatives, consequences and effectiveness of current techniques in nuclear weaponry, guerrilla and conventional warfare. *Preq:* POSC 101 or consent of instructor

432 American Constitutional Law I 3(3,0) A brief introduction to the judicial process followed by a detailed examination of leading cases pertaining to the judiciary, the Congress, the Presidency, and the federal system. *Preq:* POSC 101.

433, 633 American Constitutional Law II 3(3,0) Examination of the relationship of the individual to his government, focusing on the safeguards of liberty and property including freedoms of speech, press and religion, and criminal procedures. *Preq:* POSC 101.

434 The Judicial Process and Jurisprudence 3(3,0) Courts as political subsystems; judicial decision making; the development of public policy through the judicial process; theories of law and jurisprudence. *Preq:* POSC 101.

435 Administration of Justice 3(3,0) Examination of selected issues and questions adjudicated in the nation's courts with emphasis upon the manners in which the courts and related law enforcement agencies deal with problems of deviance under the criminal law; an evaluation from a social science perspective of the courts and these related agencies as arbiters in the resolution of conflicts under the law. *Preq:* POSC 101.

442, 642 Political Parties and Politics 3(3,0) A study of the historical development of political parties, and the role they play in the organization and functions of our national government, and the influence of politics in policymaking. *Preq:* POSC 101.

443 Public Opinion and Propaganda 3(3,0) This course examines the nature of public opinion, its social and political context, the social-psychological processes basic to it, the dynamics of its formation and change and its measurements. *Preq:* POSC 101 or consent of instructor.

444 Interest-Group Politics 3(3,0) Examination of interest groups, lobbying, and the policy process, including the formation and development, and the tactics and technology of special-interest groups, public-interest groups, and PACS. *Preq:* POSC 101.

448 Campaign Strategy and Tactics 3(3,0) A practical introduction to the planning and execution of a political campaign, designed for candidate, manager and others who play key roles in a campaign. Covers the use of pertinent data, targeting, issues, organization, use of the media, direct mail, finance, etc. Includes application of those aspects to a campaign. *Preq:* POSC 101 or consent of instructor.

453 American Political Thought 3(3,0) American political philosophy from the seventeenth century to the present with an emphasis on political and social developments since the 1770s. *Preq:* POSC 101 or consent of instructor.

454 Southern Politics 3(3,0) Southern politics since 1950 with emphasis upon the characteristics of sectional politics, decline of the one-party system, impact of desegregation and civil rights activism, political resurgence of the South in the 1970s and its impact on national politics. *Preq:* POSC 101.

457 Political Terrorism 3(3,0) Examination and analysis of the international phenomenon of terrorism in terms of origins, operations, philosophy, and objectives. *Preq:* POSC 201 or consent of instructor.

462, 662 Peace and Order in International Relations 3(3,0) Survey of obstacles to and advances in law and order in international relations. *Preq:* POSC 101, 201 or consent of instructor.

463 United States Foreign Policy 3(3,0) Focus on foreign policy in its historical perspective, examining the decision-making process in foreign policy; evaluates contemporary American capabilities, and analyzes specific issues. *Preq:* POSC 101, 201.

465 Foreign Policies of the Major Powers 3(3,0) Study in the foreign policies of the leading world powers with special reference to the geographic, economic, historical and political determinants of each. A general introduction to the field of foreign policy. United States foreign policy is not emphasized. *Preq:* POSC 361 or consent of instructor.

471 Politics of the Soviet Union 3(3,0) Examination and analysis of the Soviet Union's political process, its evolution as a communist society, and the overall direction of its international status as a superpower. Attention is also given to political and nationalist divisions. *Preq:* POSC 201 or consent of instructor.

475 Political Systems of Latin America 3(3,0) Examination of political processes in Latin America from both institutional and national perspectives. *Preq:* POSC 101, 201, or consent of instructor.

476 Political Systems of the Middle East 3(3,0) Comparative examination of the political processes of the Middle East, emphasizing a socio-cultural approach to the problems of political development. The overview of the course concentrates upon the Arab and non-Arab states of Jordan, Lebanon, Syria, the United Arab Republic, Iran, Israel, and Turkey. *Preq:* POSC 101, 201, or consent of instructor.

482 The Political Novel and the Cinema 3(3,1) Consideration of how political science is treated in political novels and cinema, and how political opinions are shaped by these media. *Preq:* POSC 101, 201, or consent of instructor.

H490 Senior Honors Thesis Research 3(3,0) Reading and research related to the senior honors thesis.

H491 Senior Honors Thesis 3(3,0) Research and writing of the senior honors thesis.

POULTRY SCIENCE (PS)

Professors: B. D. Barnett, J. W. Dick, B. L. Hughes, *Acting Head;* J. E. Jones, R. J. Thurston; *Associate Professors:* G. P. Birrenkott, Jr., D. V. Maurice; *Assistant Professor:* M. A. Hall

101 Avian Pets—Biology and Owner Responsibilities 1(1,0) Systematic coverage of the many types of birds that humans keep as social companions. The nutrition, environmental considerations, reproductive habits, health, legal and economic aspects of these pets will be considered.

201 Poultry Husbandry 3(3,0)F A study of the principles of poultry production and marketing and of the anatomy and physiology of the economically important poultry and game bird species. *Preq:* Consent of instructor.

323 Poultry and Poultry Products Evaluation 2(0,4) Selection of layers, broilers, and turkeys. Grading of poultry products according to USDA grade standards will also be studied. Students enrolled in this course are eligible to compete in Intercollegiate Poultry Judging Contests. *Preq:* PS 201 or consent of instructor.

355, 655 Poultry Products Grading and Technology 3(2,3)S, Odd-numbered years. Factors important in the quality of poultry products are considered. The effects of production, handling, packaging and storage on consumer acceptability are discussed. Quality evaluation will be considered from the standpoint of tenderness, flavor, microbiology, and USDA grades.

400, 600 Avian Physiology 3(3,0)S Even-numbered years. Detailed study of the structure and function of organ systems of avian species with emphasis on digestion and reproduction. Students are given an opportunity to study organ system(s) of their choice using quantitative physiological techniques. *Preq:* ANPH 301, PS 201, or consent of instructor.

402, 602 Poultry Management 3(3,0)S Odd-numbered years. A continuation of PS 201 which emphasizes management, decision-making and the application of technology to the commercial production of poultry and poultry products. *Preq:* PS 201 or consent of instructor.

403, 603 Poultry Management Laboratory 1(0,3) Companion laboratory with PS 402 which emphasizes problem solving, decision-making exercises, and familiarization with commercial poultry operations. *Preq:* PS 201 and registration in 402, or consent of instructor.

405, 605 Special Topics 1-4(1-3,0-3) Topics of interest to the student at undergraduate, graduate, and professional levels. Course is designed to give experience with avian problems not covered in other courses or on thesis research. Cumulative maximum of 4 credits. *Preq:* Consent of instructor.

406, 606 Special Problems 1-3(0,3-9) Research problems of special interest to the student. Course is designed to give laboratory experience and concentrated study in an area not covered in depth in other courses. Cumulative maximum of 3 credits. *Preq:* Consent of instructor.

451, 651 Poultry Nutrition 2(2,0)F, Odd-numbered years. The nutrient requirements of chickens, turkeys, and game birds and methods of determining these requirements are discussed. Deficiencies and excesses of vitamins and minerals and the effects of naturally occurring toxins are considered. Hand formulation and linear programming are introduced.

453, 653 Poultry Nutrition Laboratory 1(0,3) Course to impart training in basic laboratory skills and to familiarize students with common laboratory methods used in poultry nutrition.

454, 654 Least Cost Feed Formulation 1(0,2) Study of least cost formulation of animal diets. Encompasses development of ingredient composition tables, nutrient specifications, along with formulation evaluation. Linear programming and computers are used. *Preq:* NUTR 201, 401, or PS 451.

458, 658 Avian Microbiology and Parasitology 4(3,3)F, Even-numbered years. Agents causing poultry diseases; the diagnosis, prevention, and treatment of specific diseases and their economic and public health significance.

460, 660 Seminar 1(1,0) Current research reported in journals covering the various areas of avian science. Students practice interpretation of technical material for laymen. *Preq:* Consent of instructor.

471 Practicum 1-4(0,2-9) Practical, supervised experience in an approved commercial organization dealing with poultry production, processing, or distribution. The student will submit monthly reports during the practicum and will conduct a departmental seminar at its conclusion. *Preq:* Junior standing and consent of instructor.

804 Poultry Pathology 3(1,6)

805 Seminar 1(1,0)

891 Master's Research. Credit to be arranged.

PSYCHOLOGY (PSYCH)

Professors: L. Berger, S. N. Cole, J. D. Davenport, E. H. Galluscio, *Head; Associate Professors:* E. G. Brainerd, Jr., F. C. Dane, R. H. Nowaczyk, L. I. Park, N. R. Schultz, Jr., D. J. Senn; *Assistant Professors:* T. R. Alley, W. J. Burroughs, P. A. Connor-Greene, B. E. Dickson-Parnell, R. A. Marcon, D. D. Moore, B. R. Stephens, J. G. Williams

101 Orientation to Psychology 1(1,0) General orientation to the field of psychology with emphasis on areas treated within the discipline as well as interests which psychologists hold as individuals. Not open to students who have taken PSYCH 201 unless permitted by the instructor

105 Psychology of Career Choice 1(1,0) Techniques of personnel selection, career development, and vocational counseling as applied to the individual seeking a vocation. Topics to be discussed include matching oneself to a job, how to apply for various jobs, and the measurement of job success.

201, H201 Introduction to Psychology 3(3,0) Introduction to the study of behavior. An analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations

205 Research Methods and Measurement 3(3,0) Survey of research designs used in psychology with emphasis on designs other than experimental designs. Topics include attitude measurement, scaling techniques, field and observational research, and questionnaire construction. *Preq:* PSYCH 201.

210, H210 Introductory Experimental Psychology 4(3,3) Introduction to data analysis of experimental and correlational research in psychology Emphasis is placed on the applications and logical nature of statistical reasoning Laboratory periods stress the techniques of data analysis including analysis using microcomputers. *Preq:* PSYCH 201 or consent of instructor.

301 Applied Psychology 3(3,0) Course emphasizes the application of theories and research to the solution of problems in the community and work place. The contributions of psychology to business and industrial settings, community settings and educational settings are considered. *Preq:* PSYCH 201.

303 Psychology of Adjustment 3(3,0) Course in personal adjustment dealing with appropriate and inappropriate reactions to stress, frustration, and conflict. Consideration is given to practical coping skills and techniques for managing emotions, changing one's own behavior, and improving interpersonal relationships. *Preq:* PSYCH 201 or consent of instructor.

306 Human Sexual Behavior 3(3,0) The subject of sexual behavior is to be approached from the psychophysiological, behavioral, and cultural points of view. Evolutionary, historical, and cross-cultural perspectives will be considered.

310 Advanced Experimental Psychology 4(3,3) Continuation of PSYCH 210 with an emphasis on conducting original research in the scientific study of human and animal behavior. Laboratory periods stress the refinement of techniques and the execution of research in a guided setting. *Preq:* PSYCH 201, 210, or achievement of a satisfactory score on the departmental competency examination.

320 Principles of Behavior 3(3,0) Study of basic learning principles including classical conditioning, operant conditioning, and modeling. Initial emphasis is on animal studies followed by human applications and techniques. *Preq:* PSYCH 201, 210.

321 Principles of Behavior Laboratory 1(0,3) Laboratory work will include animal handling and training and applications of techniques from PSYCH 320. *Coreq:* PSYCH 320.

322 Sensation and Perception 3(3,0) Study of psychophysical techniques of measurement and sensory and perceptual processes related to vision, hearing, and the other senses. *Preq:* PSYCH 201, 210, and one 300-level psychology course, or consent of instructor. *Coreq:* PSYCH 323.

323 Sensation and Perception Laboratory 1(0,3) Selected experiments are conducted to demonstrate the phenomena involved in sensation and perception. *Coreq:* PSYCH 322.

330 Motivation 3(3,0) Various aspects of motivation are considered by studying physiological, emotional, and environmental influences on behavior. The orientation is empirical rather than theoretical with emphasis on pertinent research, applications, and measurement of motives. *Preq:* PSYCH 201.

333 Cognitive Psychology 3(3,0) Study of higher-order mental processing in humans. Topics include memory, learning of concepts, problem solving, and the psychology of language. *Preq:* PSYCH 201.

340 Life-Span Developmental Psychology 3(3,0) A survey of current theory and research concerned with the psychological aspects of human growth and development across the entire life span. Major topics include developmental methods, physical maturation, cognition, socialization, personality, psycholinguistics, intelligence, learning, behavior problems, and exceptionality. *Preq:* PSYCH 201.

343 Psychological Development from Conception to Adolescence 3(3,0) Emergence, growth, and change of behavior from conception to adolescence. Special consideration is given to the study of methodology and the beginning of sensory/perceptual abilities, intellectual capacities, language, social skills, and personality. *Preq:* PSYCH 201.

344 Psychology of Adolescence 3(3,0) Study of the psychosocial processes of adolescence. Major emphasis is on personality development, growth of thinking, social and sexual maturation, and variations in adolescence. *Preq:* PSYCH 201.

345 Adulthood and Aging 3(3,0) Special consideration of the major psychological processes of aging as they relate to individual behavior and adaptation. Included are the influences of aging on the body, learning and psychomotor skills, thinking and intelligence, employment and productivity, personality, and psychopathology. Opportunity for contact with institutionalized and noninstitutionalized elderly persons is provided. *Preq:* PSYCH 201.

352 Social Psychology 3(3,0) A survey course analyzing human social behavior from the perspective of the individual as a participant in social relationships. The major emphasis is on the study of such contemporary social processes as attitude formation and change, interpersonal relations, conformity, conflict resolution, aggression and violence, social communication, and group phenomena. *Preq:* PSYCH 201.

355 Environmental Psychology 3(3,0) Consideration of the influences of the physical environment on human behavior. Topics include perception of and adaptation to the environment, effects of physical design on behavior, and individual reactions to environmental stressors. *Preq:* PSYCH 201 or consent of instructor.

364 Industrial Psychology 3(3,0) Reviews the perception of work from the preindustrial revolution to the present. Comparative approaches to motivation, development, maintenance, and attraction of successful work behaviors are discussed. Topics include the organization's responsibilities to the community, implementing a disease- and accident-free workplace, and the effects of consumerism. *Preq:* PSYCH 201.

368 Organizational Psychology 3(3,0) Analysis of individual behavior for the purpose of investigating problems in organizations and increase organization effectiveness. Topics include psychological factors affecting communication, decision making, conflict, leadership, work stress, power, and organizational change. *Preq:* PSYCH 201.

370 Personality 3(3,0) Introduction to the area of personality theory emphasizing psychoanalytic, behavioral, and humanistic approaches. Applications of personality theories to such topics as development and adjustment are considered and research implications are evaluated. *Preq:* PSYCH 201.

397 Skills in Human Relations 3(3,0) Application of the concepts of psychology to both individual and professional behavior. A practical course which emphasizes training in human-relations skills and improving the individual's ability to relate to other persons, particularly in psychological services and professions. *Preq:* PSYCH 201 or consent of instructor.

415, 615 Systems and Theories of Psychology 3(3,0) Study of the development of psychology particularly during the past 100 years. Emphasis on giving the student a better perspective of present-day psychology. The focus is on the various approaches taken by influential psychologists and the conflicts among these approaches. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor

424, 624 Physiological Psychology 3(3,0) Study of human neuroanatomy with emphasis on the functions of the nervous and endocrine systems. Discusses the biological basis of behavior in its normal and abnormal dimensions *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor. *Coreq:* PSYCH 425.

425, 625 Physiological Psychology Laboratory 1(0,3) Demonstrations and techniques of selected physiological procedures are presented to explain the principles discussed in PSYCH 424. *Coreq:* PSYCH 424

435, 635 Human Factors Psychology 3(3,0) Analyses of theoretical issues and research methods pertaining to the interaction between people and machines and human performance. Topics include information processing theory, human control systems and displays, task simulation, perceptual and motor factors limiting human performance *Preq:* PSYCH 201, and one 300-level psychology course or consent of instructor

459, 659 Group Dynamics 3(3,0) Review of current theory and research on small-group processes with special emphasis given to group formation and development, group structure, the dynamic forces within a group, leadership, and group problem solving and decision making. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor.

470, 670 Theories of Personality 3(3,0) Analysis of classical and contemporary theories of personality inlcuding Freudian, neo-Freudian, behavioristic, humanistic, and existentialistic theories. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor

471 Psychological Testing 3(3,0) Introduction to the theory of psychological testing emphasizing the principles of measurement and the characteristics of a good psychological test. The understanding of basic principles is applied to experiences in test development, administration, and interpretation. Measures of personality, interests, ability, aptitude, and achievement are considered. *Preq:* PSYCH 201 and 210 or consent of instructor

480, 680 Health Psychology 3(3,0) Study of the role of health-related behaviors in the prevention, development and/or exaverbation of health problems. Emphasis on the biopsychosocial model and its application in the assessment, treatment, and prevention of health problems. *Preq:* PSYCH 201, one 300-level PSYCH course or consent of instructor.

483, 683 Abnormal Psychology 3(3,0) Study of the physiological, psychological, and cultural factors involved in such behavioral disorders as transient situational disturbances, personality disorders, psychoneuroses, psychoses, and psychosomatic disturbances. Special emphasis is placed on the advantages and disadvantages of particular conceptual models in labeling and describing behaviors as either normal or abnormal. *Preq:* PSYCH 201 and one 300-level psychology course or consent of instructor.

488 Theories of Psychotherapy 3(3,0) Survey of alternative theories of psychological treatment for behavioral and emotional disorders. Various theoretical assumptions, techniques, and applications of each approach are examined and compared and case examples are considered. *Preq:* PSYCH 370 or consent of instructor.

H490 Senior Division Honors Research I 2-4(2-4,0) Preparation and defense of a research proposal. The proposed project should be empirical, historical, or theoretical in nature. *Preq:* Junior standing and consent of department head.

H491 Senior Division Honors Research II 2-4(2-4,0) Completion of the proposed research project resulting in a written thesis. *Preq:* PSYCH H490.

493 Practicum in Clinical Psychology 3(1,5) Students are given an opportunity to apply classroom theory in solving individual and community problems through interaction with community agencies and other professional groups in the mental health area. The student has limited but well-controlled contact with actual clinical problems as they occur in the community environment. *Preq:* Consent of instructor.

495 Practicum in Applied Psychology 3(1,5) Students are provided practical experience in the area of applied psychology. The student usually will be involved in a project designed to help solve an industrial problem through a direct application of industrial or social psychology. *Preq:* Either PSYCH 352 or 364 or 397 and consent of instructor.

497 Directed Studies in Psychology 2-4(2-4,0) Study of a particular topic under the direction of a faculty member. Specific program is to be organized by the student and faculty member and submitted to the department head for approval. May be repeated for a maximum of six credits. *Preq:* PSYCH 310, one additional 300-level psychology course, and consent of instructor.

499, 699 Seminar Topics in Current Psychology 3(3,0) A seminar in current topics in psychology. Topics will change from semester to semester and will be announced prior to each semester's registration. May be repeated once for credit, but only if a different topic is covered. *Preq:* PSYCH 201 and one 300-level course or consent of instructor.

RELIGION (REL)

Professor: C. H. Lippy; *Associate Professor:* L. J. Greenspoon

101 Introduction to Religion 3(3,0) Variety of religious experience and expression in human life.

301 The Old Testament 3(3,0) Survey of books of the Old Testament with special consideration given to the development of the concepts, institutions, and theology of the ancient Hebrews.

302 A Survey of New Testament Literature 3(3,0) Study of the books of the New Testament from the standpoint of their occasion, content, literary form, and basic theology.

306 Judaism 3(3,0) Examination of the development of Judaism from Biblical to modern times.

307 The Christian Tradition 3(3,0) Examination of the development of Christianity in Western civilization from the post-New Testament period to the present, stressing institutional growth and changes, theological currents, and the interaction of Christianity with culture.

308 Religions of the Ancient World 3(3,0) Selected religious movements in ancient Mesopotamia, Egypt, Canaan, and the Greco-Roman world with emphasis on movements outside the Judeo-Christian tradition.

309 Oriental Philosophies and Religions 3(3,0) Study of the philosophical and religious teachings of Hinduism, Buddhism, Confucianism, and Taoism.

310 Religion in the United States 3(3,0) Development of religion in the United States from the Colonial period to the 20th century. Attention will be devoted to analyzing broad currents in religious movements and religious thought which have given shape to the American pluralistic experience.

401, 601 Studies in Biblical Literature and Religion 3(3,0) Critical examination of a selected topic in biblical studies. The topic will vary from year to year. May be repeated one time for credit. *Preq:* Consent of instructor.

402, 602 Studies in Religion 3(3,0) Thorough examination of a selected topic in one or more of the religious traditions of the world or of religious life in a particular region. The topic will vary from year to year. May be repeated one time for credit. *Preq:* Consent of instructor.

499 Independent Study 1-3(1-3,0) Study of selected problems, issues, or movements in religion under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the head of the department prior to registration. *Preq:* Consent of instructor.

RURAL SOCIOLOGY (RS)

Professors: E. L. McLean, B. H. Robinson, *Head*

301 Rural Sociology 3(3,0)F, S Study of human social relationships as influenced by life in the open country and in small towns and villages including considerations of the rural population, rural social institutions, processes of change in agricultural technology, and community area planning and development.

303 (SOC) Methods of Social Research I 3(3,0) See SOC 303

359, 659 (SOC) The Community 3(3,0)F Examination of the sociological aspects of contemporary communities and of their growth and development. The structural relations of social class, status and power and the relationships among social institutions within the community are examined. Emphasis is placed on the organization and development of communities in a constantly changing environment.

371 (SOC) Population and Society 3(3,0) See SOC 371

401, 601 (SOC) Human Ecology 3(3,0)S Analysis of the interrelationships between man and his natural and man-made environments, study of settlement patterns, social organizations, and institutions of human populations. Special emphasis will be given to interdependency of natural resources, human resources, and man-land relationships. *Preq:* Consent of instructor.

403, 603 (SOC) Methods of Social Research II 3(3,0) See SOC 403

471, H471, 671 (SOC) Demography 3(3,0)S Demographic concepts, theory, and research methods for vital statistics, migration, and population distribution and projections, the collection and processing of demographic data, and the organization of demographic data systems. *Preq:* RS (SOC) 359

495 (SOC) Field Experience 3(1,8) See SOC 495

498 (SOC) Independent Study 3(1,6) See SOC 498

881 Rural Sociology Research 1-3(0,2-6)

RUSSIAN (RUSS)

101, H101 Elementary Russian 4(3,1) Training in pronunciation, grammatical forms, and syntax with a view of giving the student the fundamentals necessary to read simple Russian texts. Three hours a week classroom instruction and one hour a week in the language laboratory.

102, H102 Elementary Russian 4(3,1) Continuation of RUSS 101. *Preq:* RUSS 101.

196 Practicum in Russian 1(0,1) On-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year standing in language or consent of department head.

201, H201 Intermediate Russian 3(3,0) Brief review of RUSS 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Russian prose in short stories and plays. *Preq:* RUSS 102.

202, H202 Intermediate Russian 3(3,0) Conversation, composition, and dictation based on readings of more difficult Russian prose than in the earlier courses. *Preq:* RUSS 201.

398 Directed Reading 1-3(1-3,0) Directed study of selected works in Russian. May be repeated for a total of six semester credits. *Preq:* RUSS 202 or equivalent and consent of department head.

SAFETY AND HEALTH (SH)

Assistant Professors: P. F. Petersen, K. E. Stine; *Instructor:* S. A. Schultz; *Lecturer:* J. H. Abraham

100 Current Topics in Occupational Safety and Health 1(1,0) Discussion of current events related to occupational safety and health and the rights and responsibilities of employee, employers, and the public. Topics will include changes in OSHA and EPA, right-to-know legislation, product liability, benefit-cost analysis, and business-cost control.

300 Safety and Health Management Principles 3(3,0) Fundamentals of Safety and Health Management in the business setting. Prepares the student for advanced courses in specialty areas of safety including loss prevention, industrial hygiene and fire protection.

301 Industrial Accident Prevention and Loss Control I 3(3,0) Philosophies and techniques involved in development of accident prevention and loss control methods, procedures, and programs. The principles and concepts relating to the identification, appraisal, and correction of accident and loss-producing conditions.

302 Industrial Accident Prevention and Loss Control II 3(3,0) Continuation of SH 301. Technical aspects of industrial accident prevention and loss control. *Preq:* SH 301 or consent of instructor.

305 Fundamentals of Industrial Hygiene 3(3,0) Anticipation and recognition of workplace stresses from chemical, biological, physical, and ergonomic agents, and assessment of their effects on human health. Included are fundamental concepts of toxicology, industrial hygiene, and risk assessment. *Preq:* Three credit hours of physical or biological science.

306 Industrial Hygiene Management 3(3,0) Management of specific chemical, physical, biological, and ergonomic stresses in the workplace from historical and contemporary viewpoints, including regulatory issues and other current industrial concerns. *Preq:* SH 305 or CH 102 or equivalent.

307 Industrial Hygiene Practice 4(3,3) Problems of evaluation and control of industrial exposure are considered. Sampling theory, study design, and survey technique are discussed. Control principles are presented. Instrument calibration, field sampling, and data interpretation will be investigated in the laboratory. *Preq:* SH 306 or consent of instructor.

401 Fundamentals of Fire and Explosion 3(3,0) The first of a two-course sequence will present the theory of combustion, principles of detection, and fundamentals of control agents. Products of combustion and the response of humans and building materials are discussed. *Preq:* SH 302, 306, or consent of instructor.

402 Fire Protection and Prevention 3(3,0) Analysis of fire safety problems; design of adequate protection and prevention measure; and concentration in the areas of construction, occupancy, exposure, and protection as they apply to the industrial environment. *Preq:* SH 401.

404 Seminar in Safety and Health 3(3,0) Directed readings and reports on recent advances or issues concerned with safety and health. Issues of ethics, policy, costs, and relations among business, society, labor, and government are stressed. *Preq:* SH 307, 401. *Coreq:* MGT 415.

407 Directed Research in Safety and Health Management 1(1,0) Student selects a research project of interest in the field of safety and health management, plans it, conducts the research and presents the findings in a research report. Student is encouraged to choose a real-world problem and contact businesses for actual data. *Preq:* Senior standing.

410 Safety in Building Construction 3(3,0) Fundamentals of accident prevention and the Occupational Safety and Health Act as they apply to the planning, design, and construction stages of construction projects.

430, 630 (ENT) Toxicology 3(3,0) See ENT 430.

450 Toxic Substance Management 3(3,0) Management of hazardous substances in the workplace and general environment, including current topics in industrial toxicology, industrial waste management, product safety and business liabilities. *Preq:* SH 100 or consent of instructor.

SCIENCE AND TECHNOLOGY IN SOCIETY (STS)

300 Issues in Science, Technology and Society 3(3,0) Course will help students understand how technology and science operate within a total societal context by examining various issues that exist in society. Focus is placed on how we use those machines and principles and the results of that use.

SOCIOLOGY (SOC)

Professors: K. W. Crader, R. J. Knapp, R. F. Larson, *Head; Associate Professors:* L. G. Peppers, C. M. Sieverdes, D. K. Sturkie III, W. M. Wentworth, M. F. White; *Assistant Professors:* H. M. Clark, S. Kenig, C. McKelvey, J. W. Ryan, B. J. Vander Mey; *Visiting Assistant Professor:* D. K. Crossman

201 Introduction to Sociology 3(3,0) Sociological perspective: study of contemporary groups, organizations, and societies in terms of human social behavior, social change, social structure, and social institutions.

202 Social Problems 3(3,0) Social problems involving the family, education, health care, political and legal systems, economy, population, environment, community; and special problems associated with age, economic, racial, status, and gender inequality.

303 (RS) Methods of Social Research I 3(3,0) Introduction to methods of social research: research design, sampling, measurement, reliability, and validity; the relationship between theory and research. Required of all Sociology majors. *Preq:* SOC 201.

310 Marriage and Intimate Relationships 3(3,0) Examination of mate selection, living together, marital relations, family planning, conflict resolution, divorce and remarriage, later life adjustments, and singlehood as a life-style in the United States. *Preq:* SOC 201 or consent of instructor.

311 The Family 3(3,0) Cross-cultural analysis of the family as a basic social institution; the history, structure, and functions of the family in various cultures; and effects of social change on the family. *Preq:* SOC 201

330 Industrial Sociology 3(3,0) Development of industrial society; effects on culture, social institutions, and individuals; industry and community; cross-national comparison of management styles; and a comparative analysis of work in industrial and developing nations. *Preq:* SOC 201.

331 Urban Sociology 3(3,0) Urbanization as a social process and related conditions of work, family structure, social mobility, crime, lifestyle, technology, and development of urban areas in the Third World. *Preq:* SOC 201.

350 Socialization and Interpersonal Behavior 3(3,0) Effects of society upon interpersonal behavior; topics include socialization, self-concept, attitude formation and change, interpersonal attraction, and social power and influence. *Preq:* SOC 201.

351 Collective Behavior 3(3,0) Spontaneous, transitory, and sporadic group behavior: crowds, panics, riots, fads, and social movements. *Preq:* SOC 201.

359, 659 (RS) The Community 3(3,0) See RS 359.

371 (RS) Population and Society 3(3,0) Social, economic, and political consequences of population structure and change, including problems of food and resources, as well as population goals and policies in developing countries and the United States. *Preq:* SOC 201.

380 Introduction to Social Services 3(3,0) Fundamentals of casework practice, including philosophy and values, models of group work and ethics in social services work. *Preq:* SOC 201.

381 Social Service Delivery Systems 3(3,0) Delivery of social services; social service agencies; community action; social service planning, policy, and evaluation; and future trends in social services delivery. *Preq:* SOC 201.

382 Child and Family Welfare 3(3,0) Societal contexts of problems affecting children and their families, including the legal status of family members, family violence, neglect, runaways, child care, and teenage pregnancy. *Preq:* SOC 201.

383 Sociology of Death 3(3,0) Death and dying as social processes, including bereavement, death as social behavior, attitudes toward death, and mechanisms for coping with death, suicide, and euthanasia. *Preq:* SOC 201.

390 Sociological Approach to Law Enforcement 3(3,0) Sociological analysis of contemporary law enforcement in the overall criminal justice process, including historical and cross-national comparisons. *Preq:* SOC 201.

391 Sociology of Deviance 3(3,0) Patterns of deviant behavior: subcultures, careers, and life-styles of deviants; deviance theory and research. *Preq:* SOC 201.

392 Juvenile Delinquency 3(3,0) The nature, extent, and causes of juvenile delinquency; societal attempts to control delinquent conduct and gang violence; emergence of the juvenile justice system. *Preq:* SOC 201.

393 Criminology 3(3,0) The nature, and causes of criminal behavior; societal attempts to control crime; social responses to crime, criminals, and the criminal justice system. *Preq:* SOC 201.

394 Sociology of Mental Illness 3(3,0) Mental illness as a social phenomenon, including cultural and social influences, organizational settings of mental health care delivery, legal issues, patient-therapist relationships, and mental illness intervention as social control. *Preq:* SOC 201.

395 Sociology of Alcohol and Drug Abuse 3(3,0) Social issues involved in alcohol and drug abuse, including the assessment of sociological theories of drug abuse, addiction, and prevention; societal problems associated with the misuse of alcohol, narcotics, and other drugs. *Preq:* SOC 201.

401, 601 (RS) Human Ecology 3(3,0) See RS 401.

403, 603 (RS) Methods of Social Research II 3(3,0) Advanced methods in social research; consideration of various techniques, methodological approaches, and research designs; laboratory experience in various phases of research. *Preq:* SOC 201, SOC (RS) 303 or consent of instructor.

404, 604 Sociological Theory 3(3,0) A survey of the development of sociological theory. Required of all Sociology majors. *Preq:* SOC 201.

430, 630 Sociology of Organizations 3(3,0) The analysis of administrative organizations and voluntary associations; applied analysis of their formal and informal group relations, communications, and effectiveness. *Preq:* SOC 201.

431 Social Stratification 3(3,0) Class, status, and power in society; class differences in behavior, values, and social mobility. *Preq:* SOC 201.

432 Sociology of Religion 3(3,0) A sociological analysis of religious systems and movements and their influence on other social institutions. *Preq:* SOC 201.

433, 633 Developing Societies 3(3,0) Examination of the social and historical causes of development and underdevelopment. Various sociological theories of development are reviewed. Selected countries are examined in an international context. *Preq:* SOC 201.

440, 640 Leisure, the Mass Media, and Culture 3(3,0) Production and consumption of leisure activities in contemporary society; popular culture, and the mass media as dominant leisure forms; social effects of leisure activities; relationship between work and leisure. *Preq:* SOC 201.

441, 641 Sociology of Sport 3(3,0) Sport as a social phenomenon; emphasis on leadership, discrimination, socialization, communication, conflict, and cooperation in sport; emerging social issues in contemporary sports. *Preq:* SOC 201.

460 Racial and Ethnic Relations 3(3,0) Racial and ethnic minorities in the United States, including the nature and causes of prejudice, discrimination, intergroup tensions, and conflict. *Preq:* SOC 201.

461 Sociology of Sex Roles 3(3,0) Female and male socialization; changes in statuses, roles, and opportunities in contemporary society, with cross-cultural comparisons. *Preq:* SOC 201.

471, H471, 671 (RS) Demography 3(3,0) See RS 471.

480, 680 Medical Sociology 3(3,0) Sociocultural factors in the etiology and treatment of physical illness; medical occupations and professions; the organization of health-care delivery systems. *Preq:* SOC 201.

481, 681 Sociology of Aging 3(3,0) Theories of aging; influence of aging populations on health care, welfare programs, and retirement systems; special problems of early retirement. *Preq:* SOC 201.

490, 690 Rehabilitation Systems 3(3,0) Institutional and community-based systems of rehabilitation and reintegration of persons involved with crime, delinquency, alcohol, drug, emotional difficulties, and other stigmatizing characteristics. *Preq:* SOC 201

495 (RS) Field Experience 3(1,8) Students participate in selected field placements under supervision for eight hours weekly and in a one-hour seminar per week May be repeated once for credit. Graded on a pass/fail basis. *Preq:* SOC 381 or 390 and consent of department head.

498 (RS) Independent Study 3(1,6) Individual readings or projects in sociological areas not covered in other courses. A written proposal must be approved by the instructor directing the work and by the department head prior to registration. *Preq:* Consent of department head.

499 Seminar in Selected Topics in Contemporary Sociology 3(3,0) Sociological areas of current interest will be explored. May be repeated by special arrangement for a maximum of six credits. *Preq:* Consent of department head.

SPANISH (SPAN)

Professor: G. J. Fernandez; *Associate Professors:* L. T. Perry, M. M. Sinka; *Assistant Professors:* B. G. Durham, P. R. Heusinkveld, S. C. King, J. A. McNatt, R. F. Mixon, L. E. Seamon, S. E. Torres, J. M. Whitmire

101, H101 Elementary Spanish 4(3,1) A course for beginners in which the essentials of grammar are taught and a foundation is provided for a conversational and reading knowledge of the language. Three hours a week of classroom instruction and one hour a week in the language laboratory

102, H102 Elementary Spanish 4(3,1) Continuation of SPAN 101.

196 Practicum in Spanish 1(0,1) An on-campus program of teaching foreign languages to children. Students work under the supervision of faculty in planning and teaching one 45-minute class per week to children in grades 1-8. May be repeated for a total of 3 credits. *Preq:* Third year language standing or consent of department head.

198 Situational Spanish 4(3,2) Intensive course relating to a student's field of study. Designed primarily for non-Liberal Arts majors preparing for employment or study abroad. Subsequent placement into SPAN 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements.

199 Situational Spanish 4(3,2) Continuation of SPAN 198. Subsequent placement into SPAN 201 or 205 by departmental examination. Only for elective credit in the College of Liberal Arts. Cannot be counted toward any Bachelor of Arts language requirements. *Preq:* SPAN 198 or consent of instructor.

201, H201 Intermediate Spanish 3(3,0) A brief review of SPAN 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of Spanish prose in short stories and plays. *Preq:* SPAN 102.

202, H202 Intermediate Spanish 3(3,0) Introduction to Spanish literature: representative short stories, essays, novels, poetry, and plays. *Preq:* SPAN 201.

205 Elementary Spanish Conversation and Composition 3(3,0) Intensive oral and written training in Spanish through conversation groups, speeches, written compositions, and controlled vocabulary acquisition. May be taken concurrently with SPAN 202, 303, or 311. *Preq:* SPAN 201.

299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three semester credits. *Preq:* Consent of instructor directing the play.

303 Survey of Spanish Literature I 3(3,0) Literary movements, influences, and authors from the beginnings to the end of the seventeenth century. Representative works, discussions. Required of Spanish majors. *Preq:* SPAN 201, 202.

304 Survey of Spanish Literature II 3(3,0) Literary movements, influences, and authors from the eighteenth century to the present. Required of Spanish majors. *Preq:* SPAN 201, 202.

305 Intermediate Spanish Conversation and Composition I 3(3,0) Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension. Some written work to increase accuracy. Assignments in the language laboratory. *Preq:* SPAN 202 or consent of department head. Required of Spanish majors.

306 Intermediate Spanish Conversation and Composition II 3(3,0) A continuation of SPAN 305 with more emphasis on written Spanish. *Preq:* SPAN 305 or consent of department head.

307 Spanish Civilization 3(3,0) Study of the significant aspects of the culture of Spain from its origins to the present. Required of Spanish majors. *Preq:* SPAN 202 or consent of department head.

308 Spanish-American Civilization 3(3,0) Study of the significant aspects of the culture of Spanish-American countries from the pre-Colonial period to the present. Required of Spanish majors. *Preq:* SPAN 202 or consent of department head.

311 Survey of Spanish-American Literature 3(3,0) Literary movements, influences, authors, and works from the Colonial period to the present. Required of Spanish majors. *Preq:* SPAN 202 or consent of department head.

316 Spanish for International Trade I 3(3,0) Spoken and written Spanish common to the Hispanic world of business and industry, with emphasis upon business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and Spanish cultural patterns in a business setting. *Preq or Coreq:* SPAN 202 and 305, or consent of department head

398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Spanish literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department head.

401 Modern Spanish Literature 3(3,0) The generation of 1898 to the Civil War: Readings from Unamuno, Azorin, Valle-Inclan, Antonio Machado, Ortega Y Gasset, Garcia Lorca, and Alejandro Casona. *Preq:* SPAN 303, 304, or 311

402 Contemporary Spanish Literature 3(3,0) Spanish literature from the Civil War reconstruction period to the present with emphasis on the contemporary novel and theatre *Preq:* SPAN 303, 304, or 311

409 Advanced Grammar and Composition 3(3,0) Intensive study of syntax and stylistics through composition and translations. Practice in spoken Spanish. *Preq:* Senior standing or consent of department head.

414 Practical Communication Skills 3(3,0) Study of those communication skills (correspondence, composition, legal, medical, technical, and business terms) essential to effective communications with native Spanish speakers in these areas. *Preq:* SPAN 306, 316, or consent of department head.

416 Spanish for International Trade II 3(3,0) Study of the language and cultural environment of the Spanish-speaking markets of the world, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* SPAN 316.

422 The Contemporary Spanish-American Novel 3(3,0) New trends in the development of the Spanish-American novel from the 1940's to the present. *Preq:* SPAN 303, 304, or 311.

435 Contemporary Hispanic Culture 3(3,0) Study of social, political, economic, and artistic manifestations of contemporary Hispanic culture. *Preq:* SPAN 307, 308, or consent of department head.

498 Independent Study 1-3(1-3,0-3) Directed study of selected topics in Spanish language, literature, and culture. *Preq:* Consent of department head.

499, 699 Spanish Literature, Language, and Culture 3(3,0) Selected topics and themes that have characterized Spanish literature, language, and culture throughout the centuries. May be repeated for a maximum of six credits. *Preq:* SPAN 303, 304, 311, or consent of department head.

TEXTILE CHEMISTRY (TC)

Professors: J. R. Aspland, H. M. Behery, M. J. Drews, T. D. Efland, B. C. Goswami, J. J. Porter, B. L. Rutledge II, F. T. Simon, E. A. Vaughn, *Director; Associate Professors:* C. W. Jarvis, C. D. Rogers; *Assistant Professors:* M. S. Ellison, O. F. Hunter, Sr., G. C. Lickfield; *Lecturer:* J. C. Hubbard, Jr.

303 Textile Chemistry 3(3,0) Study of the properties and reactions of aliphatic and aromatic organic compounds. Emphasis will be placed on mechanistic interpretations and the development of synthetic schemes leading to polyfunctional compounds of the types encountered in the textile industry. *Preq:* CH 102. *Coreq:* MTHSC 206.

304 Textile Chemistry 3(3,0) Fundamental principles of physical chemistry with emphasis on areas frequently encountered in the textile industry including thermodynamics, kinetics, and solution properties. These concepts will be applied to the study of organic compounds and organic reaction mechanisms. *Preq:* TC 303.

305 Textile Chemistry Laboratory 1(0,3) Introduction to the techniques used in the synthesis and characterization of organic compounds. *Coreq:* TC 303.

306 Textile Chemistry Laboratory 1(0,3) Techniques used in the measurement of the physiochemical properties of polymers and textile chemicals. *Coreq:* TC 304.

315, 615 Introduction to Polymer Science and Engineering 3(3,0) Chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed emphasizing fiber forming, synthetic polymers. Includes molecular characterization, structure, morphology, and mechanical properties as they relate to the design of polymer systems for end uses in textiles, geotextiles, plastics and fiber-reinforced composite materials. *Preq:* CH 201 and 330 or 224, TC 304, or consent of instructor.

316, 616 Chemical Preparation of Textiles 3(2,3) The chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Collodial and surface active properties of various compounds and the fundamental factors influencing these properties.

317 Polymer and Fiber Laboratory 1(0,3) High molecular weight polymers are prepared from monomers and their chemical and physical properties are measured as functions of critical end use parameters using instrumental and physical methods. *Coreq:* TC 315.

405 Principles of Textile Printing 3(2,3) The development of modern textile printing systems will be studied. In addition, the colloidal requirements of colorants, thickener compositions, rheology of printing pastes, and the various physical requirements necessary for a successful printing system in a modern plant will be examined. *Preq:* TEXT 314 or consent of instructor.

406 Textile Finishing—Theory and Practice 3(2,3) Study of the application of chemicals to textile substrates and how they affect the substrate's physical and chemical properties. The course emphasizes the theories of chemical modification of textiles as well as the technology of finishing.

457, 657 Dyeing and Finishing I 3(3,0) Study of the different classes of dyestuffs and the chemistry of their applications to different fibers. The theories, principles and mechanisms for the dyeing of textile fibers and fabrics will be presented as well as the reaction mechanisms of various finishing agents applied to different substrates. *Preq:* TC 315.

458, 658 Dyeing and Finishing II 3(3,0) The kinetics and equilibria of dyeing processes. The use of conductivity, diffusion and other methods useful for measuring absorption of isotherms and dyeing rates and the general thermodynamic relationships applicable to dyeing operations. Fiber properties such as zeta potential, dye sites, relative amorphous area available will be included.

459, 659 Dyeing and Finishing Laboratory I 1(0,3) Course will introduce the student to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. *Coreq:* TC 457.

460 Dyeing and Finishing Laboratory II 1(0,3) Course will cover finishing in addition to dyeing operations and their instrumental control. *Coreq:* TC 458.

475, 675 Cellulose Chemistry 2(2,0) The organic chemistry of cellulose and its derivatives is developed from the basic principles of carbohydrate chemistry. Emphasis is placed on the substitution and degradation reactions which are of particular importance in textile applications. Fiber morphology is treated in relation to its effect on textile chemical processing. *Preq:* TC 315 or consent of instructor.

811 Polymer Science I 3(3,0)

812 Polymer Science II 3(3,0)

821 Chemistry of Natural Polymers 3(3,0)

831 The Physical Chemistry of Dyeing 3(3,0)

891 Master's Research. Credit to be arranged.

TEXTILE MANAGEMENT AND TEXTILE SCIENCE (TEXT)

Professors: J. R. Aspland, H. M. Behery, M. J. Drews, T. D. Efland, B. C. Goswami, J. J. Porter, B. L. Rutledge II, F. T. Simon, E. A. Vaughn, *Director; Associate Professors:* C. W. Jarvis, C. D. Rogers; *Assistant Professors:* M. S. Ellison, O. F. Hunter, Sr.; *Instructor:*M. D. Whitley; *Lecturers:* J C. Hubbard, Jr., B. F Rankin

175 Introduction to Textile Manufacturing 3(3,0) Introduction to the broad fields of textile, fiber, and polymer science and engineering with emphasis on the scientific, technological, and business principles utilized in producing fibers, yarns, and fabrics; enhancing fabric functionality by dyeing, finishing and printing; and establishing end-use products.

176 Natural and Man-made Fibers 4(3,3) Concept of natural and synthetic polymers as the raw materials of the textile industry is introduced. A survey of the origin, characteristics, and processing properties of various natural fibers and fiber-forming synthetic polymers. Formation of textile fibers from polymeric materials will be presented with specific emphasis on the polymer science and engineering principles.

201 Yarn Structures and Formation 4(3,3) Study of the fiber processing systems required to transform various fibrous materials into yarn. The course involves the machine principles and theories, relationship of the fibers to the process and the resultant yarn structures, and subsequent analysis of the yarn structure to define quality and to determine suitable manufacturing practices. *Preq:* TEXT 175 and 176 or consent of instructor.

202 Fabric Structures, Design, and Analysis 4(3,3) Study of fabric formation techniques designed to explore the principles and theories of modern technology. Evaluation and analysis of weaving, knitting, and nonwoven fabrication of textile structures. *Preq:* TEXT 201 or consent of instructor.

203 Introduction to Computer Applications in Textiles 3(3,0) Introduction to the use of micro and minicomputers and mainframe terminal sharing in the textile industry. Topics will include computer applications in both processing and management using BASIC and FORTRAN.

301 Fiber Processing I 3(2,2) Study of fibrous materials and their relationship to the fiber processing systems. The objectives, theories, principles, and mechanisms of the machines used in the earlier stages of fiber processing. The course is directed primarily to the staple fiber processing systems. Mechanical and mathematical fundamentals are applied to the machines concerned.

302 Fiber Processing II 3(2,2) Continuation of TEXT 301 emphasizing the later stages of fiber processing for the ultimate yarn strand. *Preq:* TEXT 301.

308 Apparel 4(3,3) Introduction to apparel construction techniques and analysis of problems commonly encountered in the apparel industry. Evaluation of fabric design and properties. *Preq:* TEXT 202 or consent of instructor.

311 Fabric Development I 3(2,2) Study of the basic theory of the cam loom weaving machine. The principles of designs of the basic plain, twill, and sateen fabric, and other weaves such as the honeycomb, the mock leno, and the huckaback weave. Weave analysis and preparation of necessary drafts are included.

312 Fabric Development II 3(2,2) Study of the theory and operation of the dobby head, Knowles head, Staubli dobby, Jacquard head, and multicolor selection for the above looms. Weave design for compound fabrics using two or more systems of warp and filling threads for three-dimensional weaves, weave analysis, and preparation of drafts are covered. *Preq:* TEXT 311.

313 Fabric Formation 3(3,0) Examination of the theories involved in the assembly of fibers and yarns into fabrics. The application of design, analysis and production of woven, knitted and nonwoven fabrics. A brief survey of the fabric producing machines. Limited to Textile Chemistry and non-Textile majors.

314 Chemical Processing of Textiles 4(3,2) Concept of current procedures in the chemical, mechanical and physical preparation, bleaching dyeing, printing and finishing of fabrics are presented; colorimetric and spectrophotometric methods of color control and test methods for the evaluation of the effectiveness of the treatments are emphasized. Not open to Textile Chemistry or Textile Management Chemical option majors.

321, 621 Fiber Science 3(2,2) Fiber properties and the scientific evaluation of these properties. Dimensional, mechanical, optical, electrical, thermal, and moisure relationships are established and investigated.

322, 622 Properties of Textile Structures 3(2,2) Yarn and fabric properties, their scientific significance and analysis. Dimensional, structural, and mechanical interrelationships are established and evaluated.

324 Textile Statistics 3(3,0) Introduction to statistics with particular application to the textile industry. Measures of central value and variation, probability, the normal curve, tests of hypotheses, elementary correlation and regression. *Preq:* Junior Standing.

333 The Textile Arts 3(2,3) Survey of the development of the hand loom from prehistoric times to the present. Studio work in the elements of handwoven fabrics, their design, analysis and production of four-harness counterbalance and jack looms. *Preq:* Junior standing or consent of instructor.

403, 603 Fiber Processing III 3(2,2) Concepts of current fiber processing machines, techniques, practices, and their validity are investigated. Problems are assigned that require use of acquired knowledge, textile testing equipment, and processing machines. The relation of fibrous material properties and processing dynamics to the fiber assemblies produced is studied. *Preq:* TEXT 301, 302.

411, 611 Fabric Development III 3(2,2) Study of specifications and loom details for the production of fabrics woven to the customer's order to include multicolor layouts. Warp and filling preparation are covered as well as size formulations and their methods of application. Warping and dressing plans are developed for the warper and the slasher. *Preq:* TEXT 312.

414 Knitted Structures 3(3,0) Survey of knitted structures dealing with the principles and mechanisms involved. Various systems are covered with emphasis on fiber yarn requirements and fabric properties.

416, 616 Nonwoven Structures 3(2,2) Nonwoven fabric structures, their manufacture, properties, and applications. Methods of nonwoven fabric formation, including resultant material characteristics and end-use applications are examined. *Preq:* TEXT 301 or consent of professor.

420, 620 Advanced Computer Applications in Textiles 3(3,0) Advanced study of the use of computer as professional support devices for textile management, research, and manufacturing, decision making. *Preq:* CPSC 120 or consent of instructor.

426, 626 Instrumentation 3(3,0) The principles of industrial and process instrumentation and control. Static and dynamic characteristics of measurement devices. Transducer principles and techniques of their application for measurement of physical properties such as pressure, temperature, flow, weight, etc. Principles of process controllers. Applications of computers in textile process control.

428 Textile Research 1-3 Investigation of a problem in textile, fiber, or polymer science under the direct supervision of a faculty member. After completing the research, the student prepares a formal written report which is presented orally. *Preq:* Senior standing or consent of instructor.

429 Textile Research 1-3 Continuation of TEXT 428.

440, 640 Color Science 3(2,3) Application of the science of color to industrial practice in textiles, plastics, paints, lighting, and ceramics. Laboratory work will be performed on modern instruments and computers.

450 Textiles in Sports and Recreation 3(3,0) This course provides a basic understanding of the various types of fabrics used in athletic and recreational activities. Methods and procedures for the evaluation of fabric performance and properties as well as criteria for the selection and care of textile materials used in sports and recreational activities are provided.

460, 660 Textile Processes 3(3,0) Survey of machinery and processes of textile manufacturing from fiber formation through fabric finishing. For students with a nontextile background.

470 Textile Costing and Inventory Control 3(3,0) Study of the principles of costing as they specifically apply to the manufacture of textiles. Allocation of cost of material, labor, and overhead: determining the unit cost of yarns, fabrics, and finishes. Inventory systems, storage, materials handling and profiles. *Preq:* TEXT 202 or consent of instructor

471 Plant Layout and Processing Design 3(3,0) Survey of the essentials necessary for textile process implementation from the pilot plant concept to a functioning textile process facility. Consideration will be given to material flow requirements, power requirements, machinery layout, environmental controls, and facility design. *Preq:* TEXT 202.

472, 672 Textile International Trade 3(3,0) The course will analyze the current structure of the international textile trade including imports, exports, tarrifs and trade requirements. Field experience with local firms will be used to enhance the student's understanding. *Preq:* Senior standing or consent of instructor.

475 Textile Marketing 3(3,0) An examination of the activities involved in the distribution of textile products in today's market. Emphasis will be placed on the role of consumer research and the analysis of fashion in the design and promotion of textile products.

701 Applied Science Technologies 3(2,4)

821 Fiber Physics 3(3,0)

830 Textile Physics 3(3,0)

835 Textile Structures 3(3,0)

840 Advanced Color Science 3(2,3)

845 Geotextiles and Geomembranes in Engineering Structures 3(3,0)

846 Textile Structures II 3(3,0)

866 Fiber Formation 3(3,0)

870 Advances in Textile Manufacturing 3(3,0)

880 Selected Topics 3(3,0)

891 Master's Research. Credit to be arranged.

991 Doctoral Research. Credit to be arranged.

VOCATIONAL AND TECHNICAL EDUCATION (VTED)

710 Foundations of Vocational and Technical Education 3(3,0)

733 Curriculum Construction in Vocational and Technical Education 3(3,0)

735 Application of Instructional Technology 3(3,0)

760 Programs, Concepts, and Issues in Vocational and Technical Education 3(3,0)

761 Administration and Supervision in Vocational and Technical Education 3(3,0)

763 Inservice and Continuing Education 3(3,0)

810 Foundations of Vocational/Technical Education 3(3,0)

812 Vocational and Technical Program Finance 3(3,0)

833 Curriculum Construction in Vocational/Technical Education 3(3,0)

835 Applications of Instructional Technology 3(3,0)

850 Programs, Concepts, and Issues 3(3,0)

861 Administration and Supervision in Vocational/Technical Education 3(3,0)

863 Inservice and Continuing Education 3(3,0)

876 College Teaching 3(3,0)

882 Seminar 1(1,0)

893 Advanced Research Design and Analysis 3(3,0)

980 Internship in Vocational-Technical Education 1-6(0,3-18)

991 Doctoral Research. Credit to be arranged.

WILDLIFE AND FISHERIES BIOLOGY (WFB)

Professors: A. G. Eversole, D. L. Robinette, *Head;* J. R. Sweeney; *Associate Professors:* T. T. Fendley, J. W. Foltz, T. E. Schwedler

306 Wildlife Resources of the Southeastern United States 2(2,0) F, S Study of the wildlife resources of the Southeastern states, including population trends, life histories and economic importance. Conservation and proper utilization by man are emphasized. Not open to students who have had BIOSC 441 or WFB 412.

350 Principles of Fish and Wildlife Biology 3(3,0) Introduction to principles of fisheries and wildlife biology on which sound management practices are based. Interrelationships of vertebrate and invertebrate biology, habitat, and population dynamics will be covered. *Preq:* One year of general biology.

412, H412, 612 Wildlife Management 3(2,3) Basic principles and general practices of wildlife management and conservation will be covered. Major problems concerning the management of wildlife resources, with emphasis on upland game species. Laboratory work includes practical work on the Clemson University woodlands and field trips to several areas where wildlife management is being practiced.

416, 616 Fishery Biology 3(2,3) Principles underlying freshwater fish production. Introduction to major groups of freshwater fishes and their habitats. Topics include identification, age and growth, fecundity, food habits, populations estimation, environmental evaluation, management practices, and fish culture. *Preq:* One year of introductory biology and Junior standing.

450, 650 Aquaculture 3(3,0) Basic aquacultural techniques applied to freshwater and marine organisms; past and present culture of finfishes and shellfishes around the world; principles underlying fish production; water quality, feeding, and nutrition as they influence production of cultured aquatic organisms. *Preq:* One year of general biology and Junior standing.

460, 660 Warmwater Fish Diseases 2(2,0) Study of diseases in warmwater fishes including infectious and noninfectious processes. *Preq:* One year of general biology, Junior standing and consent of instructor.

462, H462, 662 Wetland Wildlife Biology 3(3,0) Study of wetland wildlife habitats, emphasizing classification by physical, chemical, and biological characteristics; the importance of wetland habitat for management and production of wetland wildlife species. *Preq:* BIOL 103/105 and 104/106; or 110/111.

463 Directed Research in Aquaculture, Fisheries and Wildlife Biology 1(0,3) Research problems in selected areas of aquacultural, fisheries, or wildlife science to introduce the student to experimental design, research techniques, and presentation of research results. May be repeated for a maximum of three credit hours. *Preq:* Junior standing and consent of instructor.

469, H469, 669 (ENT) Aquatic Insects 3(1,6) See ENT 469.

490 Field Training in Aquaculture, Fisheries, and Wildlife 6(0,18) The student, in an eight-to-ten week program, has the opportunity to observe aquaculture, fisheries, or wildlife management. Student will have supervised management responsibility. Total of 270 hours required. Must be prearranged at least two months in advance. To be taken pass/fail only. *Preq:* Senior standing in Fisheries and Wildlife Biology and consent of instructor.

499 Wildlife Biology and Fisheries Seminar 1(1,0) An exploration of current literature and research in fisheries and wildlife sciences. Students will participate in the analysis of research findings, utilizing skills acquired in their undergraduate programs. May be repeated once for credit.

809 Seminar in Wildlife and Fisheries Science 1(1,0)

815 Principles of Wildlife Biology 3(2,3)

816 Applied Wildlife Biology 3(2,3)

818 Ecology and Management of Wetland Wildlife 3(2,3)

819 Special Topics in Wildlife Management 1-4(1-4,0)

840 Fish and Shellfish Management 3(2,3)

860 Diagnostic Procedures of Warmwater Fish Diseases 2(1,2)

861 Special Topics in Fishery Biology 1-4(1-4,0)

863 Special Problems in Wildlife and Fisheries Biology 1-3(0,3-9)

891 Master's Research. Credit to be arranged.

WOMEN'S STUDIES (WS)

301 Introduction to Women's Studies: Women's Lives 3(3,0) This interdisciplinary course explores the unique features of women's lives from childhood to old age. Course content is based on new research in many disciplines, including psychology, sociology, history, literature and the arts. *Preq:* Sophomore literature or consent of instructor.

ZOOLOGY (ZOOL)

Professors: S. A. Gauthreaux, Jr., R. L. Hays, C. W. Helms, G. P. Noblet, E. B. Pivorun, J. E. Schindler, J. B. Wourms; *Associate Professors:* J. M. Colacino, D. G. Heckel, R. R. Montanucci, E. E. Ruppert, A. P. Wheeler, D. G. Yardley; *Assistant Professor:* D. W. Tonkyn

100 The Biology of Human Survival 1(1,0) A biological overview of aspects of contemporary life of interest to the individual and to the social welfare of man now and in the future.

222 Human Anatomy 4(3,3) A basic and systematic study of human anatomy. *Preq:* BIOL 104 or 111 or equivalent.

223 Human Physiology 4(3,3) A basic and systematic study of human physiology. *Preq:* BIOL 104 or 111 and CH 102 or 112 or consent of instructor. BIOCH 210 and ZOOL 222 recommended.

301, H301 Comparative Vertebrate Anatomy 4(3,3) A comparative and phylogenetic study of the gross morphology of vertebrates. *Preq:* BIOL 104/106 or 111.

350, H350 Developmental Biology 4(3,3) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging will be analyzed in terms of fundamental concepts and control processes. *Preq:* BIOCH 301 or consent of instructor.

403, H403, 603 Protozoology 3(3,0) A survey of the protozoa with emphasis on organization and function. Representative types of both free-living and parasitic forms will be examined for each major taxon. *Preq:* BIOL 104 and 106 or 111.

404, 604 Protozoology Laboratory 1(0,3) Laboratory exercises will reinforce the material presented in ZOOL 403 and will introduce students to techniques used in collection, preservation, and examination of protozoans. *Coreq:* ZOOL 403.

405, H405, 605 Animal Histology 4(3,3) A structural and functional study of the basic tissues of animals and the tissue makeup of organs. Mammalian histology is stressed but comparative histology will be incorporated. The course is directed toward study at the light microscope level. Detailed study of selected cells will utilize electron micrographs. *Preq:* BIOSC 202 or consent of instructor.

409, 609 Modern Biological Instrumentation 3(2,3) Introduction to the theory of operation and practical use of a variety of laboratory instruments of interest to the life scientist, including computer-based control and data-logging equipment. Includes a review of elementary electronics. The laboratory will emphasize actual instrument operation and the construction of simple electronic circuits. Not open to Engineering majors. *Preq:* Physics and an elementary knowledge of BASIC or FORTRAN.

410, H410, 610 Limnology 4(3,3) A detailed introduction to the physical, chemical, and biological interrelationships that characterize inland water environments. A fundamental approach to the interactions of components of the environment is developed at the theoretical level. Field and laboratory instruction in techniques of analysis are utilized to illustrate applications of theoretical concepts. *Preq:* BIOSC 202, General Chemistry.

415, 615 Introduction to Mathematical Ecology 3(3,0) This course will focus on current and broadly applicable mathematical models in ecology emphasizing ecological assumptions underlying mathematical approaches, theories, and limitations of specific models, and the ecological insights provided. *Preq:* MTHSC 108, BIOSC 202, or consent of instructor.

421, 621 Seminar in Invertebrate Zoology 4(3,3) The course will consider advanced topics in invertebrate zoology. Content will vary in successive years and students may enroll more than once for credit with consent of instructor. Laboratory includes benchwork, several field trips to the South Carolina coast, and one to the Florida Keys over spring break.

430, 630 Introduction to Population Genetics 3(3,0) Study of the genetic structure of populations and its importance in evolution as shown by field, experimental, and theoretical studies. Topics include natural selection, migration, genetic drift, mutation, meiotic drive, linkage, mating systems, IQ and heritability, evolution of pesticide resistance, human population genetics, eugenics, and genetic counseling. *Preq:* BIOL 111, GEN 302.

450, H450, 650 Comparative Vertebrate Embryology 4(3,3) A comparative study of the developing vertebrate body from fertilization through organogenesis. Patterns of reproduction and embryonic development, morphogenesis, organogenesis, and the functional differentiation of cells and tissues will be considered. *Preq:* ZOOL 350 or consent of instructor.

456, 656 Medical and Veterinary Parasitology 4(3,3) Introduction to parasitism in the animal kingdom with emphasis on both basic and applied principles as they relate to economically and medically important diseases. Classical and experimental approaches to the study of parasitism are examined in reference to protozoa, helminths, and arthropods. *Preq:* BIOL 104, 106, or 111.

457, H457, 657 Comparative Physiology 4(3,3) A comparative study of physiological processes throughout the animal kingdom. Laboratories will introduce the use of basic instrumentation and will provide an opportunity to perform original experiments. *Preq:* BIOCH 301 or consent of instructor.

459, H459, 659 Systems Physiology 4(3,3) Physiological systems (neural, muscular, skeletal, endocrine, circulatory, respiratory, digestive, and excretory) of vertebrates and their homeostatic controls. *Preq:* BIOSC 202 or consent of instructor.

462, 662 Herpetology 3(2,3) Systematics, life history, distribution, ecology, and current literature of amphibians and reptiles. Laboratory study of morphology and identification of world families, and U.S. genera, as well as all southeastern species. Field trips will be required. *Preq:* BIOSC 202 or consent of instructor.

463, 663 Ichthyology 3(2,3) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips will be required. *Preq:* BIOSC 202 or consent of instructor.

464, 664 Mammalogy 3(2,3) Origin, evolution, distribution, structure, and function of mammals, with laboratory emphasis on the mammals of South Carolina. Field Collection required. *Preq:* BIOSC 202 or consent of instructor.

465, 665 Ornithology 4(3,3) The biology of birds: their origin and diversification, adaptations, phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field identification is emphasized and field trips are required. *Preq:* BIOSC 202 or consent of instructor.

470, 670 Animal Behavior 3(3,0) Historical and modern developments in animal behavior emphasizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and comparative psychology. *Preq:* BIOSC 202 or consent of instructor.

471, 671 Animal Behavior Laboratory 1(0,3) Laboratory exercises that explore the behavior of animals. Emphasis is on behavioral observation and analysis and presentation of findings in a report format. *Preq:* BIOSC 202, ZOOL 470, or consent of instructor.

475, 675 Vertebrate Endocrinology 3(3,0) Introduction to the basic principles of neuroendocrine integration and homeostatic maintenance in vertebrates. Comparative morphology and physiology of various endocrine tissues and hormone chemistry and modes of action are considered. *Preq:* BIOSC 202, organic chemistry, or consent of instructor

476, 676 Experimental Vertebrate Endocrinology Laboratory 2(0,6) Laboratory to demonstrate principles discussed in ZOOL 475. Experiments conducted by individuals will be drawn from classical papers which demonstrate specific endocrine functions; original experiments will examine hormonal effects on selected physiological parameters, and assays and determinations of unknown hormones will be made. *Preq:* ZOOL 475 or consent of instructor

480, 680 Analysis of Development 3(3,0) Concepts, problems, and experimental observations central to the study of cellular differentiation and development, particularly in animals. Emphasis is on the critical reading of research literature on the control of genetic expression and nucleocytoplasmic, cell-cell, and cell-environmental interactions. *Preq:* ZOOL 350 or consent of instructor.

491 Special Problems in Zoology 2-4 Library and laboratory experience in experimental design and research in selected biological discipline. Results will be presented in an open seminar and in a research paper to be evaluated by at least two faculty members. May be taken for credit no more than twice for a maximum of 8 credits. *Preq:* Junior or Senior standing and consent of instructor.

493 Undergraduate Seminar 1(1,0) Exploration of current zoological literature. *Preq:* Senior standing.

701 Man's Impact on Ecology 3(3,0)

803 Population Dynamics 4(2,6)

810 Behavioral Ecology 3(3,0)

812 Seminar 1(1,0)

815 Physiological Ecology 4(3,3)

816 Advanced Ecosystem Analysis I 4(3,3)

817 Advanced Ecosystem Analysis II 4(3,3)

818 Community Ecology 4(3,3)

835 Interpretative Electron Microscopy 3(3,0)

852 Principles and Methods of Systematic Zoology 2(2,0)

861 Special Topics 1-4(1-4,0)

863 Special Problems 1-4

865 Advanced Ornithology 3(3,0)

881 Methods in Developmental Biology 2(0,6)

883 Special Topics in Evolutionary Biology 1-4(1-3,0-3)

884 Special Topics in Physiology 1-4(1-3,0-3)

885 Special Topics in Ecology 1-4(1-3,0-3)

Faculty

Abbott, Albert Glenn, *Assistant Professor of Biochemistry.* BS, University of Connecticut, 1976; PhD, Brown University, 1980

Abdalla, Dennis Arthur, *Lecturer in Horticulture.* BS, University of Maryland, 1958; MS, Clemson University, 1962; PhD, Rutgers University, 1972

Abernathy, Atwell Ray, *Professor of Environmental Systems Engineering.* BA, Lenoir-Rhyne College, 1953; MSPH, 1959, PhD, 1963, University of North Carolina

Abraham, John Harwood, *Lecturer in Management.* BS, Virginia Polytechnic Institute and State University, 1973; MS, Webster University, 1983

Abramovitch, Rudolph Abraham, *Professor of Chemistry.* BS, Alexandria University, 1950; PhD, King's College, 1953; DSc, University of London, 1964

Abrams, Leslie Elise, *Head of Architecture Library; Assistant Librarian.* BA, Mount Holyoke College, 1976; MSLS, University of North Carolina, 1977

Ackerman, Carl Willis, *Professor of Animal Science.* BS, 1953, MS, 1960, Clemson University

Acorn, John Thompson, *Head of History and Visual Studies Department; Professor of History and Visual Arts.* BA, Montclair State College, 1959; MFA, Cranbrook Academy of Art, 1961

Acton, James Crockett, *Professor of Food Science.* BS, 1965, PhD, 1970, University of Georgia

Adams, Jill Leslie, *Visiting Instructor in Nursing.* BS, University of South Florida, 1983; MS, Georgia State University, 1986

Adams, Minerva Rios, *Lecturer in Mathematical Sciences.* BS, University of Puerto Rico, 1978; MS, Virginia Polytechnic Institute and State University, 1982

Adams, Warren Philip, *Assistant Professor of Mathematical Sciences.* BS, Lewis University, 1979; MS, 1981, PhD, 1984, Virginia Polytechnic Institute and State University

Addison, Clarence Lee Benjamin, *Professor of Building Science.* BArch, Howard University, 1959; MArch, Clemson University, 1974

Adler, Peter Holdridge, *Assistant Professor of Entomology.* BS, Washington and Lee University, 1976; MS, 1979, PhD, 1983, Pennsylvania State University

Ahmadian, Mehdi, *Assistant Professor of Mechanical Engineering.* BS, 1980, MS, 1981, PhD, 1984, State University of New York

Aitken, James Bruce, *Professor of Horticulture, Sandhill Research and Education Center.* BS, 1962, MS, 1964, Clemson University; PhD, University of Florida, 1967

Alam, Kursheed, *Professor of Mathematical Sciences.* BS, 1941, MS, 1943, Patna Science College; PhD, University of Minnesota, 1963

Albert, Harold Edward, *Professor of Political Science.* BS, Madison College, 1957; BD, United Theological Seminary, 1960; MAT, Miami University (Ohio), 1960; PhD, Florida State University, 1972

Alberts, James Joseph, *Adjunct Professor of Zoology.* BA, Cornell College, 1965; MS, Dartmouth College, 1967; PhD, Florida State University, 1970

Albrecht, John Ernest, *Professor of Animal Science, Pee Dee Research and Education Center.* BS, Delaware Valley College, 1965; MS, 1968, PhD, 1971, North Carolina State University

Allen, Joe Frank, *Professor of Chemistry.* BA, Berry College, 1955; MS, University of Mississippi, 1959; PhD, Georgia Institute of Technology, 1963

Allen, Keith Roy, *Assistant Professor of Computer Science.* MA, 1967, PhD, 1970, University of Virginia; MS, Indiana University, 1979

Allen, Robert Arthur, *Instructor in Computer Science.* BS, Berry College, 1982; MS, Clemson University, 1985; PhD, University of Tennessee, 1972

Allen, Robert Max, *Professor of Forestry.* BS, 1947, MS, 1951, Iowa State University; PhD, Duke University, 1958

Allen, William Harold, *Professor of Agricultural Engineering.* BS, 1966, MS, 1969, Clemson University; PhD, University of Tennessee, 1972

Alley, Forrest Christopher, *Professor of Chemical Engineering.* BS, 1951, MS, 1956, Auburn University; PhD, University of North Carolina, 1962; PE

Alley, Thomas Robertson, *Assistant Professor of Psychology.* BA, BS, Pennsylvania State University, 1975; MA, 1979, PhD, 1981, University of Connecticut

Alphin, John Gilbert, *Professor of Agricultural Engineering, Pee Dee Research and Education Center.* BS, 1960, MS, 1962, PhD, 1965, North Carolina State University

Alverson, David Roy, *Associate Professor of Entomology.* BS, 1968, MS, 1976, Clemson University; PhD, University of Georgia, 1979

Amacher, Ryan Custer, *Dean, College of Commerce and Industry; Professor of Economics.* BA, Ripon University, 1967; PhD, University of Virginia, 1971

Anand, Subhash Chandra, *Professor of Civil Engineering.* BS, Banaras Hindu University (India), 1955; MS, 1965, PhD, 1968, Northwestern University; PE

Anand, Vera Barata, *Associate Professor of Engineering Graphics.* BS, University of Para (Brazil), 1961; MS, Northwestern University, 1966

Anderson, Karen Ruth, *Cataloger; Assistant Librarian.* BA, 1970, MLS, 1972, Western Michigan University

Aneja, Sarla, *Instructor in Biology.* BS, 1958, MS, 1960, University of Delhi; Dip Microbiology, 1974, City of London Polytechnic Institute

Arbena, Joseph Luther, *Professor of History.* AB, George Washington University, 1961; PhD, University of Virginia, 1970

Armistead, Myra Ann, *Reference Librarian; Associate Librarian.* BA, Furman University, 1958; MLn, Emory University, 1963; MA, Clemson University, 1977

Arnold, Edwin Pratte, *Assistant Professor of German.* BA, University of South Carolina, 1958; MA, Kent State University, 1968

Arora, Rajendra Kumar, *Visiting Professor of Electrical and Computer Engineering.* BS, 1962, MS, 1963, University of Roorkee; PhD, University of Dundee, 1965; MA, 1979, PhD, 1981, University of Connecticut

Artzrouni, Marc, *Visiting Assistant Professor of Mathematical Sciences.* BS, University of Grenoble, 1976; MS, 1978, PhD, University of Paris, 1981

Askew, George Robert, Jr., *Associate Professor of Forestry, Belle W. Baruch Forest Science Institute.* BS, 1976, MS, 1978, PhD, 1981, Clemson University

Aspland, John Richard, *Professor of Textiles.* BS, 1958, MS, 1960, Leeds University; PhD, Manchester University, 1964

Astle, Deana, *Head of Technical Services Division; Associate Librarian.* BA, Brown University, 1967; MLS, University of California, 1968; MA, University of Utah, 1976

Aucoin, Claire Russell, *Assistant Professor of Mathematical Sciences.* BA, Shorter College, 1951; MS, Auburn University, 1954

Aucoin, Clayton Verl, *Professor of Mathematical Sciences and Management; University Marshal.* BA, Louisiana College, 1951; MS, 1953, PhD, 1956, Auburn University; Post Doctorate, Stanford University, 1960-61

Austin, William Renwick II, *Head of Aerospace Studies Department; Professor of Aerospace Studies.* Col., U.S. Air Force; BS, Clemson University, 1959; MA, Webster College, 1983

Aziz, Nadim Mahmoud, *Assistant Professor of Civil Engineering and Engineering Graphics.* BSCE, 1978, MS, 1980, PhD, 1984, University of Mississippi

Bagwell, Mary Ann, *Instructor in Nursing.* BSN, 1970, MN, 1983, University of South Carolina

Bailey, Frances Knowland, *Visiting Instructor in Nursing.* BSN, Clemson University, 1974; MSN, University of Alabama, 1976

Baines, Elizabeth Murrow, *Associate Professor of Nursing.* BS, College of St. Mary, 1962; MSN, 1976, PhD, 1981, University of Nebraska

Baker, Donald Nelson, *Adjunct Professor of Agriculture.* BS, Pennsylvania State University, 1956; MS, 1959, PhD, 1962, Cornell University

Ballard, Robert Edward, *Associate Professor of Botany.* BS, 1966, MA, 1968, Miami University; PhD, University of Iowa, 1975

Barber, Mary Frances, *Assistant Professor of Nursing.* BSN, 1973, MSN, 1976, Hunter College

Barefoot, Susan Ferguson, *Assistant Professor of Food Science and Microbiology.* BS, 1971, MS, 1979, PhD, 1984, North Carolina State University

Barfield, Rayford Elliott, Jr., *Associate Professor of English.* BA, LaGrange College, 1961; MA, University of Georgia, 1963; PhD, University of Tennessee, 1969

Barger, Sara Elizabeth, *Acting Associate Dean, Professional Services; Associate Professor of Nursing.* BSN, University of Maryland, 1967; MN, Emory University, 1973; DPA, University of Georgia, 1982

Barham, Barbara Chicvara, *Assistant Professor of Nursing.* BSN, Barry College, 1970; MS, Rutgers University, 1977

Barker, James Frazier, *Dean, College of Architecture; Professor of Architecture.* BArch, Clemson University, 1970; MArch, Washington University, 1973; AIA

Barlage, William Berdell, Jr., *Associate Dean for Instruction, College of Engineering; Professor of Chemical Engineering.* BS, Lehigh University, 1954; MChE, University of Virginia, 1955; PhD, North Carolina State University, 1960

Barnett, Bobby Dale, *Acting Associate Director, Agricultural Experiment Station; Professor of Poultry Science.* BS, 1950, MS, 1954, University of Arkansas; PhD, University of Wisconsin, 1957

Barnett, Ortus Webb, Jr., *Professor of Microbiology, Plant Pathology and Physiology.* BSA, 1961, MS, 1965, University of Arkansas; PhD, University of Wisconsin, 1968; Post Doctorate, Scottish Horticultural Institute, 1968-69

Barnett, William Jackson, *Adjunct Associate Professor of Engineering Technology.* BS, Clemson University, 1963; MS, Rutgers University, 1965; PhD, Clemson University, 1972

Baron, William, *Associate Professor of Civil Engineering.* BSCE, City College of New York, 1960; MSCE, 1963, PhD, 1966, Purdue University; PE

Barrett, David Elm, *Associate Professor of Education.* BA, Wesleyan University, 1969; MS, 1973, PhD, 1974, University of Southern California

Barrett, Robert Troy, *Assistant Professor of Management.* BS, University of North Carolina, 1976; MBA, East Carolina University, 1978; PhD, Virginia Polytechnic Institute and State University, 1984

Barth, Clyde Lewis, *Professor of Agricultural Engineering.* BS, University of Illinois, 1955; MS, 1961, PhD, 1971, University of Wisconsin

Bata, Reda Mohamed, *Assistant Professor of Engineering Graphics.* BS, 1964, MS, 1980, Cairo University; PhD, University of Florida, 1985

Bauer, Larry Lee, *Professor of Agricultural Economics and Rural Sociology.* BS, University of Illinois, 1961; MS, Purdue University, 1963; PhD, North Carolina State University, 1968

Bauld, Nelson Robert, Jr., *Professor of Mechanical Engineering and Engineering Mechanics.* BSME, 1958, MS, 1960, West Virginia University; PhD, University of Illinois, 1963; PE

Baumgardner, Reginald Andrew, *Professor of Horticulture.* BS, Clemson University, 1957; MS, 1960, PhD, 1962, University of Maryland

Baxa, Ernest Granville, Jr., *Associate Professor of Electrical and Computer Engineering.* BEE, University of Virginia, 1962; MSEE, 1968, PhD, 1970, Duke University

Baxter, Luther Willis, *Professor of Plant Pathology and Physiology.* BS, Eastern Kentucky State College, 1950; MS, 1952, PhD, 1954, Louisiana State University

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Beasley, Donald Erwin, *Assistant Professor of Mechanical Engineering.* BS, 1978, MS, 1980, Clemson University; PhD, University of Michigan, 1983

Becker, Robert Henry, *Director, Regional Resources Development Institute; Professor of Parks, Recreation, and Tourism Management.* BS, Pennsylvania State University, 1970; MA, 1973, PhD, 1976, University of Maryland

Beckwith, William Frederick, *Professor of Chemical Engineering.* BS, 1957, MS, 1961, PhD, 1963, Iowa State University; PE

Behery, Hassan Mohamad, *Professor of Textiles.* BS, 1950, MS, 1955, Alexandria University; PhD, Manchester College of Science and Technology, 1959

Belcher, Cynthia Leahy, *Assistant Professor of Nursing.* BSN, University of Miami, 1969; MN, Emory University, 1971

Benjamin, Daniel Kelly, *Professor of Economics.* BA, University of Virginia, 1969; MA, 1971, PhD, 1975, University of California

Bennett, Archie Wayne, *Head of Electrical and Computer Engineering Department; Professor of Electrical and Computer Engineering.* BS, 1960, MS, 1963, Virginia Polytechnic Institute and State University; PhD, University of Florida, 1966; PE

Bennett, John Everett, *Associate Professor of Electrical and Computer Engineering.* BSEE, 1958, MSEE, 1968, PhD, 1970, University of Tennessee

Berg, Edward Walter, *Adjunct Professor of Bioengineering.* BA, University of Colorado, 1958; MD, University of Colorado School of Medicine, 1962

Berger, Leonard, *Professor of Psychology.* AB, 1968, MA, 1969, PhD, 1972, Temple University

Beyerlein, Adolph Louis, *Professor of Chemistry.* BS, Fort Hays Kansas State College, 1960; PhD, University of Kansas, 1966

Bilge, Fertac Huseyin, *Assistant Professor of Bioengineering.* BS, Bogazinci University (Turkey), 1973; MS, Texas A&M University, 1978; PhD, University of Texas Health Science Center at Dallas, 1982

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Bishop, Carl Barnes, *Associate Professor of Chemistry.* BS, Clemson University, 1954; PhD, Michigan State University, 1959

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Bishop, Muriel Boyd, *Professor of Chemistry.* BA, Huntingdon College, 1952; MS, Emory University, 1955; PhD, Michigan State University, 1958; Post Doctorate, Yale University, 1958-59

Black, Donald Burdette, *Adjunct Associate Professor of Chemistry.* BS, University of Illinois, 1933

Black, John Olar, Jr., *Head of Seed Certification Department; Lecturer in Agronomy and Soils.* BS, 1957, MS, 1961, Clemson University

Blair, Dudley Wayne, *Professor of Economics.* BS, 1970, PhD, 1975, Texas A&M University

Blanton, Lloyd Houston, *Professor of Agricultural Education.* BS, 1961, MAgEd, 1968, Clemson University; PhD, Ohio State University, 1970

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Boettner, George Robert, *Visiting Assistant Professor of Recreation and Park Administration.* BS, 1965, MEd, 1966, East Carolina University

Book, Norman Loyd, *Professor of Building Science.* BAE, 1955, MEngr, 1967, PhD, 1973, Pennsylvania State University; AIA; PE

Bookmyer, Beverly Brandon, *Professor of Physics and Astronomy.* BA, Chestnut Hill College, 1946; MS, 1961, PhD, 1964, University of Pennsylvania

Bose, Anil Kumar, *Associate Professor of Mathematical Sciences.* BS, 1948, MS, 1956, Calcutta University; PhD, University of North Carolina, 1964

Bowman, Larry Stanley, *Adjunct Professor of Bioengineering.* BA, West Virginia University, 1969; MS, Clemson University, 1971; MD, Medical University of South Carolina, 1974

Box, Benton Holcomb, *Acting Vice President/Vice Prevost for Agriculture and Natural Resources; Professor of Forestry.* BS, 1957, MF, 1959, Louisiana State University; DF, Duke University, 1967

Boyer, Thomas Hugo, *Visiting Instructor in Electrical and Computer Engineering.* BS, College of Charleston, 1975; MS, Clemson University, 1984

Boykin, Joseph Floyd, Jr., *Director of Libraries; Librarian.* BS, 1962, MS, 1965, Florida State University

Bradshaw, David Winstead, *Associate Professor of Horticulture.* BS, 1968, MS, 1973, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1977

Bragg, Charles Kenneth, *Adjunct Professor of Textiles.* BS, Wofford College, 1961; MS, Institute of Textile Technology, 1963

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Brannan, James Richard, *Associate Professor of Mathematical Sciences.* BS, 1973, MS, 1976, Utah State University; PhD, Rensselaer Polytechnic Institute, 1979

Brannock, Durant York, Jr., *Assistant Professor of French.* BA, Elon College, 1954; MA, Duke University, 1956

Brantley, Herbert, *Acting Dean, College of Forest and Recreation Resources; Head of Parks, Recreation, and Tourism Management Department; Professor of Parks, Recreation, and Tourism Management.* BA, 1956, MA, 1958, PhD, 1966, University of North Carolina

Branum, Quie Kay, *Assistant Professor of Nursing.* BSN, Baylor University, 1971; MSN, 1978, PhD, 1985, Texas Woman's University

Brasseur, James Gordon, *Assistant Professor of Mechanical Engineering.* BS, University of Maryland, 1973; MS, 1976, PhD, 1979, Stanford University

Brawley, Joel Vincent, Jr., *Alumni Professor of Mathematical Sciences.* BS, 1960, MS, 1962, PhD, 1964; North Carolina State University

Bridges, William Carroll, Jr., *Assistant Professor of Experimental Statistics.* BS, University of North Carolina, 1980; MS, 1982, PhD, 1984, University of Nebraska

Bridgwood, Joan, *Lecturer in Russian.* BA, University of Leeds (England), 1967

Bridgwood, Michael Andrews, *Assistant Professor of Electrical and Computer Engineering.* BSC, Leeds University, 1968; MSC, 1975, PhD, 1979, Portsmouth Polytechnic

Brisbin, I Lehr, Jr., *Adjunct Associate Professor of Wildlife.* BA, Wesleyan University, 1962; MS, 1965, PhD, 1967, University of Georgia

Briscoe, Ida Carolyn, *Professor of Education.* BA, LaGrange College, 1957; MEd, 1961, SEd, 1967, EdD, 1970, University of Georgia

Brittain, Jere Alonzo, *Acting Head of Horticulture Department; Professor of Horticulture.* BS, Clemson University, 1961; PhD, Virginia Polytechnic Institute and State University, 1967

Brooker, Reginald John, *Adjunct Associate Professor of Microbiology.* BA, University of North Carolina, 1963; MD, Emory University, 1967

Brooks, Afton DeWayne, *Assistant Dean, Graduate School; Associate Professor of Education.* BA, Carson-Newman College, 1963; MEd, Middle Tennessee State University, 1967; EdD, University of Georgia, 1972

Brooks, Gary Thomas, *Assistant Professor of Mathematical Sciences.* BS, 1979, MS, 1983, PhD, 1984, University of North Carolina

Brown, Bruce Thomas, *Assistant Professor of Military Science.* Capt., U.S. Army; BS, North Carolina State University, 1975; MA, Western Kentucky University, 1978

Brown, Carolyn Scurry, *Professor of Biochemistry.* BA, Winthrop College, 1964; PhD, Vanderbilt University, 1969

Brown, Farrell Blenn, *Associate Dean, Graduate School; Professor of Chemistry.* BS, Lenoir-Rhyne College, 1957; MS, 1960, PhD, 1962, University of Tennessee; Post Doctorate, Texas A&M University, 1962-63

Brown, Lamar Hamilton, *Acting Associate Dean, College of Architecture. Professor of Building Science.* BArch, Auburn University, 1948; AIA, AIC

Brown, Richard Bertram, *Associate Chemist, Agricultural Chemical Services; Lecturer in Food Science.* BS, St. Francis College, 1968; MS, Old Dominion University, 1975; PhD, Clemson University, 1981

Brown, Russell Henry, *Head of Civil Engineering Department; Professor of Civil Engineering and Engineering Mechanics.* BS, University of Houston, 1966; PhD, Rice University, 1970; PE

Brown, Susan Henrietta, *Associate Professor of Marketing.* BA, 1947, JD, 1950, University of Georgia; LLM, University of Pennsylvania, 1972

Brown, Thomas Miller, *Associate Professor of Entomology.* BS, Adrian College, 1970; MS, 1971, PhD, 1973, Michigan State University

Brown, William Glynn, Jr., *Professor of Animal Science, Sandhill Research and Education Center.* BS, University of Tennessee, 1953; MS, Oklahoma State University, 1958; PhD, University of Arkansas, 1973

Bryan, Edward Lewis, *Associate Professor of Accounting.* BS, U.S. Naval Academy, 1961; MS, 1966, DBA, 1980, George Washington University

Bryant, Hallman Bell, *Professor of English.* BA, Emory University, 1959; MA, University of North Carolina, 1962; PhD, Vanderbilt University, 1967

Buckner, Sam Levi, *Associate Professor of Education.* BS, 1955, MS, 1957, North Carolina State University; PhD, Vanderbilt University, 1967

Buford, Marilyn Ann, *Adjunct Assistant Professor of Forestry.* BS, Southwestern at Memphis, 1976; MS, State University of New York, 1979; PhD, North Carolina State University, 1983

Bunn, Joe Millard, *Professor of Agricultural Engineering.* BS, 1955, MS, 1957, North Carolina State University; PhD, Iowa State University, 1960

Burati, James Louis, *Associate Professor of Civil Engineering.* BS, Virginia Polytechnic Institute and State University, 1974; MS, Ohio State University, 1975; PhD, Pennsylvania State University, 1984

Burch, Elmer Earl, Jr., *Professor of Management and Mathematical Sciences.* BS, 1966, MS, 1968, PhD, 1970, Clemson University

Burkett, Byron Verner, Jr., *Associate Professor of Industrial Education.* BS, 1964, MInEd, 1965, Clemson University; PhD, University of South Carolina, 1976

Burnett, George Wesley, *Associate Professor of Recreation Resource Management.* BA, Southern Methodist University, 1966; MSLS, Our Lady of the Lake University, 1970; MA, 1974, PhD, 1976, University of Oklahoma

Burroughs, William Jeffrey, *Assistant Professor of Psychology.* BS, University of Washington, 1975; MA, 1977, PhD, 1981, Arizona State University

Burrows, Peter Michael, *Professor of Experimental Statistics.* BSc, University of Manchester (England), 1960; PhD, North Carolina State University, 1971

Burt, Philip Barnes, *Professor of Physics.* BA, 1956, MS, 1958, PhD, 1961, University of Tennessee

Butler, Chalmers McNair, *Professor of Electrical and Computer Engineering.* XF34; 77, MS, 1959, Clemson University; PhD, University of Wisconsin, 1962

Butler, John Harrison, *Head of Music Department; Professor of Music.* BME, West Texas State University, 1955; MFA, 1960, EdD, 1968, University of Georgia

Butler, John Kenrick, Jr., *Associate Professor of Management.* BS, Brown University, 1963; MBA, Michigan State University, 1970; DBA, Florida State University, 1977

Byerley, Neil Elmore, *Lecturer in Accounting.* BSBA, University of Tennessee, 1958; MA, University of Florida, 1971; CPA

Byrd, Wilbert Preston, *Chairman, Experimental Statistics Unit; Professor of Experimental Statistics.* BS, 1949, MS, 1952, North Carolina State University; PhD, Iowa State University, 1955; Post Doctorate, Oregon State University, 1971

Bzdyl, Donald Gregory, *Assistant Professor of English.* BA, University of Miami, 1970; MA, 1971, PhD, 1977, University of Illinois

Caban, Jose Rafael, *Acting Head of Planning Studies Department; Associate Professor of Planning Studies.* BArch, Clemson University, 1967; MCD, University of Liverpool (England), 1971: AIA0 WP

Cain, David Wayne, *Associate Professor of Horticulture.* BS, University of Maine, 1972; MS, 1976, PhD, 1978, Michigan State University

Caldwell, Judith Dawn, *Assistant Professor of Horticulture.* BS0 1975, MS0 1977, Virginia Polytechnic Institute and State University; PhD0University of Arkansas1 2; 90

Caldwell, Rebecca Leslie, *Visiting Instructor in English.* BA, 1979, MA, 1983, University of Tennessee

Caley, Paul Cochran, *Professor of Industrial Education.* BS, 1963, MA, 1964, PhD, 1969, Ohio State University

Calhoun, Richard James, *Alumni Professor of English.* BA, George Peabody College, 1948; MA, Johns Hopkins University, 1950; PhD, University of North Carolina, 1959; Post Doctorate, Duke University, 1964-65

Calvez, Daniel Jean, *Assistant Professor of French.* License es Lettres, Angers University, 1965; PhD, University of Georgia, 1980

Campbell, Becky Fields, *Assistant Professor of Nursing.* BSN, 1974, MS, 1977, Clemson University

Campbell, Robert Benoni, *Adjunct Professor of Agronomy and Soils.* BS, 1943, MS, 1951, Utah State University

Camper, Nyal Dwight, *Professor of Plant Pathology and Physiology and of Botany.* BS, 1962, PhD, 1966, North Carolina State University

Canavera, David Stephen, *Adjunct Associate Professor of Forestry.* BS, Michigan Technological University, 1961; MS, 1967, PhD, 1969, Michigan State University

Cantrell, Harley Furman, *Adjunct Associate Professor of Microbiology.* BS, Furman University, 1961; MS, University of North Carolina, 1965; PhD, Clemson University, 1968; Post Doctorate, 1968; MT (ASCP); MI (ASCP)

Cantrell, Rayford Stephen, *Associate Professor of Management and Economics.* BS, University of Alabama, 1972; MS, University of Kentucky, 1974; PhD, North Carolina State University, 1982

Carner, Gerald Roy, *Professor of Entomology.* BA, Asbury College, 1964; MS, 1966, PhD, 1969, Auburn University

Carney, Elizabeth Donnelly, *Assistant Professor of History.* BA, Smith College, 1969; MA, 1973, PhD, 1975, Duke University

Carrillo, Loretta, *Assistant Professor of English.* BA, St. Mary's University (Texas), 1972; MA, 1974, PhD, 1979, Michigan State University

Carroll, June Langley, *District Extension Program Leader; Associate Professor of Home Economics.* BS, Winthrop College, 1954

Carter, George Emitt, Jr., *Professor of Plant Pathology and Physiology.* BS, 1968, MS, 1970, Wake Forest University; PhD, Clemson University, 1973

Cash, Luther Stephen, *Associate Professor of Accounting.* BS, 1963, JD, 1968, University of Tennessee; LLM, University of Washington, 1972

Caskey, Claire Omar, *Professor of English.* BS, Appalachian State University, 1947; MA, Duke University, 1948

Castro, Walter Ernest, *Assistant Dean, College of Engineering; Professor of Mechanical Engineering and Engineering Mechanics.* BS, Indiana Institute of Technology, 1959; MS, Clemson University, 1962; PhD, University of West Virginia, 1966; PE

Cely, Marvin Singleton, Jr., *District Extension Chairperson; Associate Professor of Horticulture.* BS, 1957, MS, 1970, Clemson University

Chapin, Jay Willard, *Associate Professor of Entomology, Edisto Research and Education Center.* BS, Dickens College, 1970; MA, East Carolina University, 1975; PhD, Clemson University, 1978

Chaplin, Robert Lee, Jr., *Professor of Physics.* BS, Clemson University, 1948; MS, 1953, PhD, 1962, North Carolina State University.

Chapman, Stephen Richard, *Acting Dean and Director of Instruction, College of Agricultural Sciences; Professor of Agronomy and Soils.* BS, 1959, MS, 1963, PhD, 1966, University of California

Chappell, William Fred, *Assistant Professor of Economics.* BA, Jacksonville State University, 1976; PhD, University of South Carolina, 1983

Chasteen, William Harold, *Adjunct Assistant Professor of Engineering Technology.* BS, Central New England College of Technology, 1974; MS, Mount St. Mary's College, 1979

Childress, April Eulanne, *Visiting Instructor in English.* BA, Presbyterian College, 1981; MA, University of Arkansas, 1983

Chisman, James Allen, *Professor of Industrial Engineering.* BS, University of Akron, 1958; MS, 1960, PhD, 1963, University of Iowa; PE

Cholewinski, Frank Michael, *Professor of Mathematical Sciences.* EP, 1958, MS, 1959, Auburn University; PhD, Washington University, 1964

Christenbury, Gerald Davis, *Professor of Agricultural Engineering.* BS, North Carolina State University, 1964; MS, Clemson University, 1966; PhD, Iowa State University, 1975

Christenbury, Joyce Hvrol, *Associate Professor of Home Economics.* BS, Winthrop College, 1962; MEd, University of North Carolina, 1970

Clark, Helen Marie,* *Assistant Professor of Sociology.* BS, 1951, MS, 1955, University of Utah; PhD, Emory University, 1973

Clark, James Edwin, *Professor of Civil Engineering.* BSCE, 1957, MS, 1964, University of South Carolina; PhD, North Carolina State University; PE, 1967

Clark, Lawrence Stanley, *Associate Professor of Accounting.* BBA, Augusta College, 1968; MAcct, University of Georgia, 1970; CPA; CMA

Clark, Stephen Chester, *Instructor in Industrial Engineering.* BSEE, Duke University, 1943

Clary, Gregory Michael, *Assistant Professor of Agricultural Economics and Rural Sociology.* BS, 1976, MS, 1978, PhD, 1982, Texas A&M University

Clement, Robert Carleton, *Instructor in Economics.* BA, 1984, MA, 1985, Clemson University

Clinkscales, William Cherry, *District Extension Program Leader; Associate Professor, 4-H and Youth Development.* BS0 South Carolina State College, 1965; MS, Clemson University, 1974; EdD, Virginia Polytechnic Institute and State University, 1984

Cochran, David Ross, *Assistant Professor of Electrical and Computer Engineering.* BS, University of Notre Dame, 1973; MS, 1977, PhD, 1981, Southern Methodist University

Cody, Jack Benjamin, *Associate Professor of Forestry.* BS, 1954, MF, 1963, University of Michigan

Coe, Charles James, *Adjunct Assistant Professor of Civil Engineering.* BS, The Citadel, 1980; MA, 1983, PhD, 1985, Princeton University

Coffeen, William Wever, *Professor of Ceramic Engineering.* BS, 1935, MS, 1937, University of Illinois; PhD, Rutgers University, 1969

Coker, Virginia Celeste, *Instructor in Animal Science.* BS, Clemson University, 1984

Colacino, James Michael, *Associate Professor of Zoology.* BA, St. John Fisher College, 1968; MA, 1970, PhD, 1973, State University of New York

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*On Leave

Colburn, Frances Louise, *Head of Circulation Unit; Assistant Librarian.* BS, Texas State College for Women, 1947; MLS, Texas Women's University, 1961

Cole, Spurgeon Nothern, *Professor of Psychology.* BA, 1960, MS, 1965, PhD, 1966, University of Georgia

Coleman, Alexander Bigger, *Instructor in English.* BS, University of Virginia, 1981

Collier, John Anton, *Associate Professor of Agricultural Engineering.* BA, Georgia Institute of Technology, 1970; MS, University of Georgia, 1972; PhD, Clemson University, 1978; PE

Collins, Aaron Strother, *Associate Professor of Electrical and Computer Engineering.* BS, 1965, MS, 1968, PhD, 1973, Clemson University

Collins, Donald Lynn, *Professor of Architecture.* BLA, North Carolina State University, 1968; MLA, Harvard University, 1969; ASLA

Collins, Joel Allen, *Associate Professor of Dairy Science.* BSA, 1962, MS, 1964, University of Tennessee; PhD, University of Kentucky, 1968

Collins, Thomas Frank, *Associate Professor of Physics and Astronomy.* BA, Mercer University, 1956; MS, Clemson University, 1958

Coltman, Ralph Read, Jr., *Adjunct Professor of Physics.* BS, Carnegie-Mellon University, 1949

Conner, Freddie Marion, Jr., *Assistant Professor of Aerospace Studies.* Capt., U.S. Air Force; BS, West Georgia College, 1978; MS, University of Southern Mississippi, 1983

Connor, Anthony Cooper, *Lecturer in Computer Science.* BS, 1957, MA, 1964, Temple University

Connor, David Richards, *Visiting Lecturer in Computer Science.* BA, University of Pennsylvania, 1960

Connor-Greene, Patricia Anne, *Assistant Professor of Psychology.* BA, Wells College, 1976; PhD, University of South Carolina, 1983

Conover, Richard Allan, Jr., *Associate Professor of Recreation and Park Administration.* BA, University of Michigan, 1953; MA, University of Wisconsin, 1968; PhD, Colorado State University, 1974

Cook, Bruce Farrell, *Director of Bands; Professor of Music.* BME, 1954, MA, 1965, West Texas State University; DMA, University of Texas, 1975

Cook, Wilton Pierce, *Associate Professor of Horticulture. Coastal Research and Education Center.* BS, 1962, MS, 1964, Clemson University

Cooke, Francis Walter, *Professor of Bioengineering and Materials Engineering.* BS, Notre Dame University, 1957; PhD, Rensselaer Polytechnic Institute, 1966

Cool, Bingham Mercur, *Professor of Forestry.* BS, Louisiana State University, 1940; MS, Iowa State University, 1941; PhD, Michigan State University, 1957

Cooledge, Harold Norman, Jr., *Alumni Professor of Architectural History.* BS, 1944, BArch, 1950, Harvard University; MA, 1957, PhD, 1964, University of Pennsylvania

Cooper, Melanie Margaret, *Visiting Instructor in Chemistry.* BS, 1975, MS, 1976, PhD, 1978, Manchester University

Copeland, Larry Byrnes, *Adjunct Instructor in Engineering Technology.* BSME, Clemson University, 1959

Cordell, Harold Kenneth, *Adjunct Professor of Forest and Recreation Resources.* BSF, 1966, MF, 1967, PhD, 1975, North Carolina State University

Coston, Donald Claude, *Professor of Horticulture.* BS, North Carolina State University, 1972; MS, 1974, PhD, 1976, Michigan State University

Couchman, Marlene Glennis, *Associate Professor of Extension Home Economics.* BS 1957, MS, 1971, Kansas State University; PhD, Oklahoma State University, 1986

Coulter, Edwin Martin, *Professor of Political Science.* BA, Furman University, 1962; PhD, University of Virginia, 1965

Courtney, William Henry III, *Associate Professor of Horticulture, Coastal Research and Education Center.* BS, University of Kentucky, 1974; MS, University of Missouri, 1976; PhD, University of New Hampshire, 1979

Cover, Alan Seymour, *Associate Professor of Mathematical Sciences.* BS, Indiana State University, 1954; MA, 1960; PhD, 1964, Pennsylvania State University

Cover, Peggy Hopkins, *Head of Reference Unit; Associate Librarian.* BA, Blue Mountain College, 1962; MS, University of Illinois, 1965

Cox, Christopher Lee, *Assistant Professor of Mathematical Sciences.* BS, Grove City College, 1978; MS, 1980, PhD, 1984, Carnegie-Mellon University

Cox, Ruby Hurley, *Assistant Professor of Home Economics; Extension Program Coordinator, Expanded Food and Nutrition Education Program.* BS, 1967, MS, 1969, PhD, 1985, University of North Carolina

Craddock, Garnet Roy, *Professor of Agronomy and Soils.* BS, Virginia Polytechnic Institute, 1952; PhD, University of Wisconsin, 1955

Crader, Kelly Wayne, *Professor of Sociology.* BS, MS, 1968, Illinois State University; PhD, Emory University, 1971

Craig, Lynn George, *Associate Professor of Architecture.* BArch, Clemson University, 1967; MArch, Washington University, 1969

Cranston, Mechthild, *Professor of French and Latin.* BA, 1958, PhD, 1966, University of California

Crino, Michael Dwain, *Professor of Management.* BA, State University of New York, 1969; MA, Northern Illinois University, 1971; MS, University of Arkansas, 1973; PhD, University of Florida, 1978

Crosby, Margaree Seawright, *Assistant Professor of Education.* BS, South Carolina State College, 1963; MEd, Clemson University, 1973; EdD, University of Massachusetts, 1976

Cross, Dee Lewis, *Professor of Animal Science.* BS, Austin Peay State University, 1968; MS, 1971, PhD, 1973, University of Kentucky

Cross, Sydney Ann, *Assistant Professor of History and Visual Studies.* BFA, Northern Arizona University, 1977; MFA, Arizona State University, 1980

Crossman, Donna Karen, *Visiting Assistant Professor of Sociology.* BA, Wittenberg University, 1965; MA, 1980, PhD, 1984, Ohio State University

Crouch, James Page, *Alumni Professor of Industrial Education.* BA, 1964, MA, 1966, San Diego State College; EdD, University of Missouri, 1968

Culin, Joseph Dayton, *Assistant Professor of Entomology.* BS, Eastern College, 1975; MS, University of Delaware, 1977; PhD, University of Kentucky, 1981

Culp, Thomas Wade, *Adjunct Professor of Agronomy and Soils.* BS, Clemson University, 1951; MS, 1953, PhD, 1956, Texas A&M University

Cunningham, Dixon Courson, *Adjunct Professor of Management.* BA, Erskine College, 1963; MBA, University of South Carolina, 1965; DBA, University of Virginia, 1970

Currin, Robert Eugene III, *Professor of Agronomy and Soils, Pee Dee Research and Education Center.* BS, North Carolina State University, 1949; MS, Clemson University, 1964

Curtis, Charles Edward, Jr., *Assistant Professor of Agricultural Economics and Rural Sociology.* BS, 1977, MS, 1979, University of Georgia; PhD, University of Nebraska, 1985

Czajkowski, Anthony Francis, *Associate Professor of Management.* BEE, Manhattan College, 1958; MS, 1963, PhD, 1972, Arizona State University

Dane, Frank Charles, *Associate Professor of Psychology.* BS, University of Wisconsin, 1973; MA, 1977, PhD, 1979, University of Kansas

Daniels, James Howard, *Associate Professor of Agricultural Education and Agricultural Engineering.* BSE, University of Arkansas, 1970; MEd, 1974, EdD, 1975, University of Illinois

Davenport, John Douglas, *Professor of Psychology.* BS, Clemson University, 1943; MA, Furman University, 1958; PhD, University of Maryland, 1967

Davis, Jack Wayne, *Visiting Instructor in Agricultural Engineering.* BS, 1975, MAg, 1976, Clemson University

Davis, James Richard, *Professor of Accounting.* BBA, 1968, MPA, 1970, PhD, 1974, Georgia State University; CMA

Davis, John Stephen, *Assistant Professor of Management.* BS, U.S. Military Academy, 1965; MS, University of Southern California, 1972; MS, Boston University, 1979; PhD, Georgia Institute of Technology, 1984

Davis, Martin Alan, *Associate Professor of Architecture.* BArch, University of Oklahoma, 1971; MPhil, University of Edinburgh (Scotland), 1973; AIA

Davis, Robert Pratt, *Head of Industrial Engineering Department; Professor of Industrial Engineering.* BSIE, 1970, MS, 1971, University of Tennessee; PhD, Oklahoma State University, 1973; PE

Davis, Rose Jones, *Professor of Home Economics, Pee Dee Research and Education Center,* BS, 1962, MS, 1964, Winthrop College; EdD, University of South Carolina, 1983

Davis, William Allen, *Assistant Professor of Military Science.* Maj., U.S. Army; BS, Florida State University, 1968; MA, Central Michigan University, 1979

Day, Frank Louis,* *Professor of English.* BS, Gorham State College, 1954; MA, University of Tennessee, 1959; MA, University of Rochester, 1967

Deal, Elwyn Ernest, *Assistant Director of Extension-Agriculture and Natural Resources; Professor of Horticulture.* BS, 1958, MS, 1960, University of Georgia; PhD, Rutgers University, 1963

Dearing, Perino Marcellin, Jr., *Associate Professor of Mathematical Sciences.* BS, 1963, MA, 1965, University of North Carolina; ME, 1971, PhD, 1972, University of Florida

Decoteau, Dennis Roger, *Assistant Professor of Horticulture, Pee Dee Research and Education Center.* BS, University of Maine, 1980; MS, 1982, PhD, 1984, University of Massachusetts

Dehart, Jean Laura, *Visiting Instructor in English.* BA, Madison Universtiy, 1983; MA, University of Tennessee, 1985

Delwiche, Michael Joseph, *Adjunct Associate Professor of Agricultural Engineering.* BS, 1974, MS, 1976, PhD, 1981, Cornell University

Derr, Alice Miriam, *Associate Professor of Education.* BA, College of William and Mary, 1970; MEd, University of Virginia, 1974; EdD, University of Arizona, 1980

Desmarteau, Darryl Dwayne, *Head of Chemistry and Geology Department; Professor of Chemistry.* BS, Washington State University, 1963; PhD, University of Washington, 1966

Dick, John Walter, *Professor of Poultry Science.* BA, Tabor College, 1965, MS, 1968, PhD, 1971, Kansas State University

Dick, Margaret Jorgensen, *Assistant Professor of Nursing.* BSN, University of Washington, 1965; MS, Boston University, 1967; PhD, University of Texas, 1984

Dickens, Thomas Lester, *Associate Professor of Accountancy.* BA, University of Richmond, 1968; MBA, Virginia Commonwealth University, 1977; PhD, Texas A&M University, 1983

Dickenson, Russell Errett, *Adjunct Professor of Recreation Resource Management.* BA, Northern Arizona University, 1947

Dickerson, Ottie Joseph, *Head of Plant Pathology and Physiology Department; Professor of Plant Pathology and Physiology; State Plant Pathologist.* BS, 1955, MS, 1956, University of Arkansas; PhD, University of Wisconsin, 1961

Dickey, Jean Louise, *Assistant Professor of Biology.* BS, Kent State University, 1972; PhD, Purdue University, 1982

Dickey, Joseph Freeman, *Alumni Professor of Dairy Science.* BS, 1956, MS, 1962, North Carolina State University; PhD, Pennsylvania State University, 1965

Dickman, Michael Robert, *Visiting Instructor in Speech.* BS, Southeast Missouri State University, 1982; MA, Wichita State University, 1985

Dickson-Parnell, Barbara Eileen, *Assistant Professor of Psychology.* BS, University of Pittsburgh, 1981; MS, 1983, PhD, 1985, University of Georgia

Diehl, John Richard, *Professor of Animal Science.* BS, Kansas State University, 1965; PhD, University of Missouri, 1973

Dieter, Janice Wong, *Visiting Assistant Professor of Chemistry.* BS, University of California, 1974; PhD, University of Pennsylvania, 1981

Dieter, Richard Carl, *Associate Professor of Chemistry.* BS, Lehigh University, 1973; PhD, University of Pennsylvania, 1981

Dill, Kilian, *Associate Professor of Chemistry.* BA, City University of New York, 1971; PhD, California Institute of Technology, 1977

Dillman, Buddy Leroy, *Professor of Agricultural Economics and Rural Sociology.* BS, 1959, MS, 1961, University of Arkansas; PhD, North Carolina State University, 1967

Dillon, Charles Ronald, *Professor of Botany.* AB, 1965, MA, 1968, PhD, 1971, University of North Carolina

DiMeglio, Sebastian Joseph, *Adjunct Professor of Travel and Tourism.* BS, Mount St. Mary's College, 1953

Dimond, Charles Augustine, *Assistant Professor of Economics.* BA, 1974, MA, 1975, Clemson University; PhD, Texas A&M University, 1984

Dimond, Thomas, *Associate Professor of Visual Arts.* BFA, Massachusetts College of Art, 1966; MFA, University of Tennessee, 1969

Dixon, Marvin Warren, *Professor of Mechanical Engineering.* BS, 1964, MS, 1965, Louisiana State University; PhD, Northwestern University, 1971; PE

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*On leave.

Doar, LeRoy Henning, *Adjunct Professor of Food Science.* BChE, Clemson University, 1952

Dodd, Roy Bryon, *Assistant Professor of Agricultural Engineering.* BS, 1968, MS, 1977, University of Georgia; PhD, Clemson University, 1983

Dooley, Ronald Larry, *Professor of Bioengineering.* BS, Virginia Polytechnic Institute and State University, 1968; MA, 1973, PhD, 1976, Clemson University

Doost, Roger Khoda, *Assistant Professor of Accounting.* BBA, University of Georgia, 1975; MBA, Industrial Management Institute (Tehran), 1973; MA, 1976, DPA, 1984, University of Georgia

Doruk, Teoman Kaya, *Professor of Architecture.* DipEngrArch, 1958, DEngr, 1965, Istanbul Technical University

Dottavio, Floyd Dominic, *Adjunct Professor of Parks, Recreation and Tourism Management.* BS, Ohio State University, 1973; MFS, Yale University, 1975; PhD, Purdue University, 1979

Doty, Coy William, *Adjunct Associate Professor of Agricultural Engineering.* BS, Auburn University, 1958; MS, South Dakota State University, 1968

Dowd, Deborah Ann, *Visiting Instructor in Parks, Recreation, and Tourism Management.* BA, Glassboro State College, 1975; MS, Arizona State University, 1979

Downs, Lorena Frances, *Visiting Instructor in Nursing.* BSN, Ohio State University, 1968; MA, Central Michigan University, 1984

Doyle, Arlene Theresa, *Adjunct Assistant Professor of Forestry.* BS, Humboldt State University, 1978; PhD, Oregon State University, 1985

Drake, Thomas Lynn, *Professor of Electrical and Computer Engineering.* BS, Tri-State College, 1958; MS, 1959, PhD, 1964, Michigan State University

Draughn, Robert Allen, *Adjunct Associate Professor of Bioengineering.* BS, 1960, MS, 1961, North Carolina State University; DSc, University of Virginia, 1968

Drew, Leland Overbey, *Professor of Engineering Technology.* BS, Clemson University, 1943; MS, Iowa State University, 1945; PhD, Michigan State University, 1963; PE

Drews, Alison Claire, *Associate Professor of Accounting.* BBA, University of Wisconsin, 1967; MS, Clemson University, 1973; CPA

Drews, Michael James, *Professor of Textiles.* BS, University of Wisconsin, 1967; PhD, North Texas State University, 1971

Driessel, Kenneth Richard, *Lecturer in Mathematical Sciences.* BS, University of Chicago, 1962; MS, 1965, PhD, 1967, Oregon State University

Drye, Charles Edwin, *Associate Professor of Plant Pathology and Physiology, Edisto Research and Education Center.* BS, Lenoir-Rhyne College, 1969; MA, Appalachian State University, 1972; PhD, Clemson University, 1976

DuBose, William Perry III, *Associate Professor of Entomology.* BS, Clemson University, 1957; MS, 1959, PhD, 1967, North Carolina State University

DuFault, Robert James, *Associate Professor of Horticulture, Coastal Research and Education Center.* BS, Norwich University, 1976; MS, University of Vermont, 1978; PhD, Kansas State University, 1982

Duffy, Bernard Karl,* *Associate Professor of Speech.* BA, 1970, MA, 1971, San Jose State University; PhD, University of Pittsburgh, 1976

Duffy, Susan, *Assistant Professor of English.* BA, Seton Hill College, 1973; MA, 1974, PhD, 1979, University of Pittsburgh

Duggan, Margaret Manning, *Visiting Assistant Professor of English.* BA, Converse College 1969; MA, 1975 PhD, 1985, University of South Carolina

Duke, Albert Link, *Professor of Electrical and Computer Engineering.* BS, Tennessee Polytechnic Institute, 1948; MS, Virginia Polytechnic Institute, 1955; PhD, Michigan State University, 1963

Duke, Lois Lovelace, *Visiting Assistant Professor of Political Science.* BA, 1976, MA, 1979, PhD, 1986, University of South Carolina

Dukes, Philip Duskin, *Adjunct Professor of Plant Pathology and Physiology.* BS, Clemson University, 1953; MS, 1960, PhD, 1962, North Carolina State University

Dumin, David Joseph, *Samuel R. Rhodes Professor of Electrical and Computer Engineering.* BS, Johns Hopkins University, 1957; MS, Purdue University, 1961; PhD, Stanford University, 1964

Dunlap, Lynn Haynes, *Instructor in English.* BA, 1976, MA, 1985, Clemson University

Dunn, Benjamin Allen, *Professor of Forestry.* BSF, 1965, MF, 1968, PhD, 1971, University of Georgia

Dunn, Charles Wythe, *Head of Political Science Department; Professor of Political Science.* BS, Illinois State University, 1962; MS, 1963, PhD, 1965, Florida State University

DuRant, John Alexander III, *Professor of Entomology, Pee Dee Reseach and Education Center.* BS, 1961, MS, 1963, Clemson University; PhD, Auburn University, 1966

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*On leave.

Durham, Bill Gravely, *Assistant Professor of Spanish.* AB, Wofford College, 1949; MEd, Furman University, 1960

Duvall, Arline Marie, *Professor of Nursing.* BSPHN, University of North Carolina, 1956; MPH, University of Michigan, 1959; EdD, Columbia University, 1972

Dyar, Amanda Gloria, *Instructor in English.* BA, 1981, MA, 1983, Clemson University

Dyck, Lawrence Alan, *Associate Professor of Botany.* BA, University of California 1965; PhD, Washington University, 1970

Dysart, Benjamin Clay III, *Professor of Environmental Systems Engineering.* BE, 1961, MS, 1964, Vanderbilt University; PhD, Georgia Institute of Technology, 1969

Edie, Danny Dale, *Interim Associate Dean for Research and Graduate Affairs; Professor of Chemical Engineering.* BS, Ohio University, 1965; MSES, The University of Toledo, 1969, PhD, University of Virginia, 1972

Edwards, Joellen Beckett, *Assistant Professor of Nursing.* BSN, Ohio University, 1978; MSN, West Virginia University, 1982

Efland, Thomas Daniel, *Associate Dean; Director of Research, College of Commerce and Industry; Professor of Textiles.* BS, North Carolina State University, 1949; MS, Georgia Institute of Technology, 1956

Eflin, Robert Dean, *Associate Professor of Architecture.* BArch, University of Minnesota, 1954; MArch, Rice University, 1972

Egan, Clifton Scott Miller, *Associate Professor of Drama.* BA, Hanover College, 1973; MFA, Northwestern University, 1976

Egan, Linda Diane, *Instructor in Speech.* BA, Hanover College, 1972; MA, Northwestern University, 1975

Egan, Martin David, *Associate Professor of Building Science.* BS, Lafayette College, 1962; MS, Massachusetts Institute of Technology, 1966

Eggert, Julia Ann, *Visiting Assistant Professor Nursing.* BSN, University of Kansas, 1972; MN, Wichita State University, 1981

Eidson, Gene Wilbur, *Lecturer in Biological Sciences.* BS, University of South Carolina, 1972; MS, Clemson University, 1975

Eisiminger, Sterling Kenwood, *Associate Professor of English.* BS, 1967, MA, 1968, Auburn University; PhD, University of South Carolina, 1974

Elling, Rudolf Ernest, *Professor of Civil Engineering and Engineering Mechanics.* BS, Michigan State University, 1950; MS, University of Illinois, 1952; PhD, Stanford University, 1967; PE

Elliott, Ralph Delano, *Director of Professional Development, College of Commerce and Industry; Professor of Economics.* BS, 1967, MS, 1968, PhD, 1972, North Carolina State University

Ellison, Michael Scot, *Assistant Professor of Textiles.* BS, 1971, MA, 1973, PhD, 1983, University of California

Elphick, Neil Carpenter, *Adjunct Professor of Environmental Systems Engineering.* BS, Clemson University, 1941

Elrod, Alvon Creighton, *Associate Professor of Mechanical Engineering.* BME, 1949, MME, 1951, Clemson University; PhD, Purdue University, 1959; PE

Elrod, George Franklin, *Visiting Assistant Professor of Education.* BA, 1971, MEd, 1974, PhD, 1984, University of Washington

Elsey, Kent Dennis, *Adjunct Associate Professor of Entomology.* BS, Washington State University, 1963; MS, 1966, PhD, 1969, North Carolina State University

Elzerman, Alan William, *Associate Professor of Environmental Systems Engineering.* BA, Williams College, 1971; PhD, University of Wisconsin, 1976

England, Robert Durant, *Adjunct Associate Professor of Art and Architectural History.* BA, University of Virginia, 1928; MA, Oglethorpe College, 1934

Eubanks, Francis Marion, *Associate Professor of Building Science.* BS, 1967, MS, 1968, Georgia Institute of Technology

Evans, John Stephen, *Head of Department of Farms; Lecturer in Agricultural Engineering.* BS, Clemson University, 1948

Evans, Robert Anthony, Jr., *Visiting Assistant Professor of Drama/Speech.* BA, Fairmont State College, 1983; MFA, University of Louisville, 1986

Evers, Dolores Anita, *Director of Continuing Education in Nursing; Assistant Professor of Nursing.* BS, Syracuse University, 1966; MS, University of California, 1968

Eversole, Arnold George, *Professor of Fisheries.* BS, Pennsylvania State University, 1963; MS, 1969, PhD, 1974, Syracuse University

Ezell, Danny Odell, *Assistant Director, Extension Field Operations; Professor of Horticulture.* BS, 1962, MS, 1964, Clemson University; PhD, University of Florida, 1968

Fain, Charles Clifford, *Professor of Ceramic Engineering.* BCerE, 1954, MS, 1957, Clemson University; PhD, Ohio State University, 1967

Fairey, John Edward III, *Professor of Botany.* BS, University of South Carolina, 1962; MS, 1964, PhD, 1972, University of West Virginia

Falk, Edward Lockwood, *Adjunct Professor of Planning Studies.* BA, 1950, MA, 1951, University of Minnesota; MRP, University of North Carolina, 1961; DPA, University of Georgia, 1979; AIP

Fanning, James Collier, *Professor of Chemistry.* BS, The Citadel, 1953; MS, 1956, PhD, 1960, Georgia Institute of Technology; Post Doctorate, Tulane University, 1960-61

Faoro, Daniel Leo, *Visiting Assistant Professor of Planning Studies.* BArch, University of Illinois, 1981; MArch, Harvard University, 1983

Faris, Jesse Edwin, *Director of International Programs, Agriculture and Natural Resources; Professor of Agricultural Economics and Rural Sociology.* BS, 1948, MA, 1951, Washington State University; PhD, North Carolina State University, 1955

Fassuliotis, George, *Adjunct Professor of Plant Pathology and Physiology.* BS, Brooklyn College, 1949; MS, 1954, PhD, 1958, New York University

Feldman, Amy Lynn, *Assistant Professor of Industrial Education.* BA, Sarah Lawrence College, 1980; MS, Rochester Institute of Technology, 1984

Fendley, Timothy Thomas, *Associate Professor of Wildlife.* BSF, 1965, MSF, 1968, University of Georgia; PhD, Utah State University, 1978

Fennell, Robert Emmett, *Professor of Mathematical Sciences.* BA, Bradley University, 1964; MS, 1966, PhD, 1969, University of Iowa

Fera, Cesare, *Professor of Architecture.* LaureaIng, 1948, LibDoctoreArch, 1966, University of Genoa (Italy)

Fernandez, Gaston Juan, *Professor of Spanish.* BLS, Instituto de Segunda Ensenanza de Remedios; LLD, University of Havana, 1942; MA, University of North Carolina, 1967; PhD, University of Kentucky, 1971

Ferreira, Eurico Jose, *Assistant Professor of Finance.* BS, Federal University of Rio de Janerio, 1964; MS, Catholic University of Rio de Janerio, 1975; PhD, University of South Carolina, 1982

Fery, Richard Lee, *Adjunct Professor of Horticulture, U.S. Vegetable Laboratory.* BS, Oregon State University, 1966; PhD, Purdue University, 1970

Fiadeiro, Jose Miguel, *Adjunct Professor of Textiles.* MS, Universidate Tecnica de Lisboa (Portugal), 1972; PhD, Universidate Politecnica de Barcelona (Spain), 1982

Fichter, Wilbur Bryan, *Adjunct Professor of Engineering Mechanics.* BS, Wake Forest University, 1957; MS, Virginia Polytechnic Institute and State University, 1966; PhD, North Carolina State University, 1969

Figliola, Richard Stephen, *Associate Professor of Mechanical Engineering.* BS, 1974, MS, 1976, PhD, 1979, University of Notre Dame

Fisher, Lorraine Rodriques, *Assistant Professor of Nursing.* BSN, University of Bridgeport, 1966; MA, University of South Florida, 1975; MS, 1982, EdD, 1986, Clemson University

Fisk, William Robert, *Associate Professor of Education.* BS, Florida State University, 1973; MS, 1976, PhD, 1979, Florida State University

Fitch, Lewis Thomas, *Professor of Electrical and Computer Engineering.* BSEE, Duke University, 1954; MS, North Carolina State University, 1960; PhD, Ohio State University, 1969; PE

Fiuzat, Abbas-Ali, *Assistant Professor of Civil Engineering.* BS, 1969, MS, 1972, American University of Beirut; PhD, Colorado State University, 1980

Fjeld, Robert Alan, *Associate Professor of Environmental Systems Engineering.* BS, North Carolina State University, 1970; MS, 1973, PhD, 1976, Pennsylvania State University

Fleming, Horace Weldon, Jr., *Director, Strom Thurmond Institute; Associate Professor of Political Science.* BA, 1965; MA, 1966; University of Georgia; PhD, Vanderbilt University, 1973

Flower, Phillip John, *Associate Professor of Physics and Astronomy.* BS, University of Toledo, 1970; PhD, University of Washington, 1976

Foltz, Jeffrey Wayne, *Associate Professor of Fisheries.* BS, Ohio State University, 1972; MS, University of Wisconsin, 1974; PhD, University of Colorado, 1978

Foreman, Christopher William, *Lecturer in Computer Science.* BS, Salisbury State College, 1975; MS, Clemson University, 1976

Forrester, William Ralph, Jr., *Assistant Professor of Marketing.* BS, 1970, MBA, 1979, PhD, 1986, University of Tennessee

Fortnum, Bruce Allan, *Associate Professor of Plant Pathology and Physiology, Pee Dee Research and Education Center.* BA, LaSalle College, 1973; MS, University of Delaware, 1975; PhD, Clemson University, 1978

Foster, Carolyn Ezell, *Visiting Instructor in English.* BA, Limestone College, 1946; MA, Emory University, 1950; MA, University of Alabama, 1985

Foster, Ida Sloan, *Reference Librarian; Assistant Librarian*. BA, Bennett College, 1962; MSLS, Atlanta University, 1973

Foster, Margaret, *Visiting Associate Professor of Planning Studies.* BA, Liverpool Polytechnic Open University, 1978; MA, Nottingham University, 1981

Franklin, Ralph Earl, *Head of Agronomy and Soils Department; Professor of Agronomy and Soils.* BSA, 1955, MS, 1957, University of Arkansas; PhD, Ohio State University, 1961

Freeman, Edwin Armistead,* *Associate Professor of Music.* BS, Clemson University, 1949; BMus, Louisiana State University, 1954; MA, Columbia University, 1968; DMA, Louisiana State University, 1976

Freeze, Chester Richard, *Professor of Education.* BS, Marion College, 1953; MEd, University of South Dakota, 1954; EdD, University of Alabama, 1963

Friedlob, George Thomas, *Professor of Accounting.* BA, Vanderbilt University, 1963; MBA, University of Louisville, 1972; PhD, University of Mississippi, 1981; CPA; CMA

Friedman, Harold Ira, *Adjunct Associate Professor of Bioengineering.* BS, Hobart College, 1967; PhD, 1972, MD, 1974, University of Virginia

Frost, David Frank, *Visiting Instructor in Electrical and Computer Engineering.* BS, University of Stellenbosch, 1974; MS, University of Pretoria, 1979

Fuhr, Donald Lee, *Associate Professor of Education.* BA, Bethany College, 1958; MEd, University of Virginia, 1965; PhD, University of Pittsburgh, 1971

Fulton, John David, *Head of Mathematical Sciences Department; Professor of Mathematical Sciences.* BS, 1960, MS, 1963, PhD, 1965, North Carolina State University

Gaddis, Joseph Leo, *Professor of Mechanical Engineering.* BS, 1961, MS, 1963, New Mexico State University; PhD, University of Texas, 1969

Gaddy, Holly Compton, *Instructor in English.* BA, University of South Carolina, 1973; MA, University of Georgia, 1985

Gahan, Lawrence Willard, *Alumni Professor of Parks, Recreation, and Tourism Management.* BS, 1960, MS, 1964, PhD, 1970, University of Illinois

Gallant, Clifford Joseph, *Visiting Assistant Professor of French/Spanish.* BS, Northern Illinois University, 1949; MA, University of Toulouse (France), 1952; MA, Middlebury College, 1954; PhD, University of Toulouse, 1959

Gallop, Reginald Ambrose, *Visiting Professor of Food Science.* ASTC, Sydney Technical College, 1945; MS, 1961, PhD, 1963, Oregon State University

Galloway, Elizabeth Boyce, *Alumni Professor of Education.* BA, Erskine College, 1958; MA, Furman University, 1963; EdD, University of Georgia, 1972

Galluscio, Eugene Hugo, *Head of Psychology Department; Professor of Psychology.* BA, California State College, 1966; MA, 1969, PhD, 1970, Louisiana State University

Garcia, Ricardo Alberto, *Associate Professor of Biology.* BS, 1968, MEd, 1970, University of Houston; PhD, Texas A&M University, 1975

Gardner, Linda Louise, *Associate Professor of Home Economics.* BS, University of North Dakota, 1967; MS, 1976, PhD, 1980, University of Arizona

Garner, Thomas Harold, *Professor of Agricultural Engineering.* BS, 1952, MS, 1956, PhD, 1964, North Carolina State University; PE

Garrett, James Thomas, *Visiting Associate Professor of Horticulture.* BS, 1964, MS, 1966, Clemson University

Garrett, Thomas Roy, *Instructor in Agricultural Engineering.* BS, 1970, MS, 1974, Clemson University

Garrison, Arthur Wayne, *Adjunct Professor of Environmental Systems Engineering.* BS, The Citadel, 1956; MS, Clemson University, 1958; PhD, Emory University, 1966

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Gentry, Robert Cecil, *Adjunct Professor of Physics.* BS, Murray State University, 1937; PhD, Florida State University, 1963

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Greene, John Monroe, *Adjunct Professor of Accountancy.* BBA, University of Georgia, 1959

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Hickman, Robert Lee, *Lecturer in Accounting.* BS, Tri-State University, 1947

Higgins, Julia Hill, *Assistant Professor of Nursing.* BSN, 1957; MN, 1971, Emory University

Hilderman, Richard Harold, *Associate Professor of Biochemistry.* BS, Jamestown College, 1966; PhD, University of Missouri, 1972; Post Doctorate, University of Connecticut, 1972-73

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Hill, James Riley, Jr., *Resident Director of Edisto Research and Education Center; Professor of Animal Science.* BS, 1956, MS, 1958, Clemson University; PhD, North Carolina State University, 1965

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Hilligoss, Susan Jane, *Assistant Head of English Department; Assistant Professor of English.* BA, University of Michigan, 1970; MA, 1971, PhD, 1977, University of Pennsylvania

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Hodges, Steven Clarke, *Assistant Professor of Agronomy and Soils.* BS, 1974, MS, 1977, University of Florida; PhD, Virginia Polytechnic Institute and State University, 1980

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Hogan, Robert John, *Associate Professor of Architecture.* BArch, 1974, MArch, 1976, Virginia Polytechnic Institute and State University

Hollis, William Milton, *Instructor in Computer Science.* BS, Clemson University, 1975

Holmes, Paul Thayer, *Professor of Mathematical Sciences.* BA, 1957, MA, 1959, Washington State University; PhD, Stanford University, 1966

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Horton, Paul Mackey, *Associate Professor of Entomology.* BS, 1969, MS, 1973, Clemson University; PhD, Auburn University, 1981

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Jackson, John Elwin, Jr., *Associate Professor of Mechanical Engineering and Engineering Mechanics.* BSAE, 1971, MS, 1973, PhD, 1977, University of Alabama; PE

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Shier, Douglas Robert, *Professor of Mathematical Sciences.* BA, Harvard University, 1968; PhD, London School of Economics, 1973

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Shilstone, Frederick William, *Associate Professor of English.* BA, Vanderbilt University, 1970; MA, 1972, PhD, 1974, Indiana University

Shipe, Emerson Russell, *Associate Professor of Agronomy and Soils.* BS, University of Tennessee, 1969; MS, Western Kentucky University, 1970; PhD, Virginia Polytechnic Institute and State University, 1978

Shively, Jessup MacLean, *Professor of Biochemistry.* BS, 1957, MS, 1959, PhD, 1962, Purdue University

Sias, Frederick Ralph, Jr., *R. A. Bowen Associate Professor of Electrical Engineering.* BS, 1954, MS, 1959, University of Florida; PhD, University of Mississippi, 1970

Sieverdes, Christopher Michael,* *Associate Professor of Sociology.* BA, University of Richmond, 1966; MS, Virginia Commonwealth University, 1972; PhD, Mississippi State University, 1973

Siler, Freddie Bush, *Reference Librarian; General Librarian.* BA, 1978, MSLS, 1983, Florida State University

Sill, Benjamin Lee, *Professor of Civil Engineering and Engineering Mechanics.* BS, 1967, MS, 1969, North Carolina State University, PhD, Virginia Polytechnic Institute and State University, 1974

Simms, John Barber, *Assistant Professor of English.* BS, Spring Hill College, 1950; MA, University of Kentucky, 1961

Simon, Curtis Joseph, *Assistant Professor of Economics.* BA, College of William and Mary, 1981; MA, 1983, PhD, 1985, State University of New York

Simon, Frederick Tyler, *J. E. Sirrine Professor of Textile Science.* BS, Morris Harvey College, 1955; MS, Marshall University, 1965

Sims, Ernest Theodore, Jr., *Professor of Horticulture.* BSA, University of Georgia, 1954; MSc, 1959, PhD, 1962, Ohio State University

Sinka, Margit Monica, *Associate Professor of German and Spanish.* BA, Baldwin-Wallace College, 1964; MA, Middleburg College, 1965; PhD, University of North Carolina, 1974

Sirmans, George Stacy, *Associate Professor of Finance.* BBA, 1974, MBA, Valdosta State College; PhD, University of Georgia, 1980

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*On leave

Sitterly, Wayne Robert, *Resident Director of Coastal Research and Education Center; Professor of Plant Pathology and Physiology.* BS, Iowa State University, 1953; MS, 1955, PhD, 1957, Purdue University

Skaar, Eric Christen, *Assistant Professor of Ceramic Engineering.* BS, Alfred University, 1970; PhD, Massachusetts Institute of Technology, 1977

Skelley, George Calvin, Jr., *Professor of Animal Science.* BS, Oklahoma Panhandle State College, 1958; MS, 1960, PhD, 1963, University of Kentucky

Skelton, Billy Ray, *Professor of Economics.* BS, 1956, MS, 1958, Clemson University; PhD, Duke University, 1964

Skelton, Bobby Joe, *Assistant Vice President for Student Affairs and Dean of Admissions and Registration; Professor of Horticulture.* BS, 1957, MS, 1960, Clemson University; PhD, Virginia Polytechnic Institute, 1966

Skelton, Thomas Eugene, *Professor of Entomology.* BS, 1953, MS, 1956, Clemson University; PhD, University of Georgia, 1969

Skewes, Peter Alan, *Assistant Professor of Poultry Science, Sandhill Research and Education Center.* BS, University of New Haven, 1979; MS, University of Florida, 1982; PhD, Virginia Polytechnic Institute and State University, 1985

Skipper, Horace Dean, *Professor of Agronomy and Soils.* BS, North Carolina State University, 1964, MS, 1967, PhD, 1969, Oregon State University

Skove, Malcolm John, *Alumni Professor of Physics.* BS, Clemson University, 1956; PhD, University of Virginia, 1960

Slann, Martin Wayne,* *Professor of Political Science.* BA, University of Miami, 1964, MA, University of Connecticut, 1966; PhD, University of Georgia, 1970

Sly, Margery Neal, *Archivist; Assistant Librarian.* BA, Dickinson College, 1979; MA, MS, Case Western Reserve University, 1981

Smith, Alton Denny, *Instructor in Biology.* BS, Mississippi College, 1972; MS, East Texas State University, 1977

Smith, Bill Ross, *Associate Professor of Agronomy and Soils.* BS, Texas Tech University, 1964, MS, University of Arizona, 1966; PhD, North Carolina State University, 1970

Smith, Daniel Bruce, *Professor of Agricultural Economics and Rural Sociology.* BS, Auburn University, 1963; MS, University of Tennessee, 1965; PhD, University of Kentucky, 1973

Smith, Michael, *Adjunct Professor of Wildlife Ecology.* BA, 1960, MA, 1962, California State University; PhD, University of Florida, 1966

Smith, Theodore Issac, *Adjunct Professor of Fisheries.* BS, Cornell University, 1966; MS, Long Island University, 1968; PhD, University of Miami, 1973

Smotherman, Mark Kelly, *Assistant Professor of Computer Science.* BS, Middle Tennessee State University, 1977; PhD, University of North Carolina, 1984

Snell, Absalom West, *Acting Dean of Agricultural Research; Acting Director of Agricultural Experiment Station; Professor of Agricultural Engineering.* BS, Clemson University, 1949; MS, Iowa State University, 1952; PhD, North Carolina State University, 1964; PE

Snelsire, Robert William, *Associate Professor of Electrical and Computer Engineering.* BA, Bethany College, 1956; BS, 1956, MS, 1958, PhD, 1964, Carnegie Institute of Technology

Snipes, David Strange, *Professor of Geology.* BS, Wake Forest University, 1950; PhD, University of North Carolina, 1965

Snoddy, Patrick Douglas, *Lecturer in Computer Science.* BS, University of Southwestern Louisiana, 1971

Southerland, Marcella Brown, *Adjunct Instructor in Nursing.* BA, Central Wesleyan College, 1972; MEd, Clemson University, 1977

Spadoni, Rosemary Ann, *Assistant Professor of Nursing.* BSN, 1956, MSN, 1970, Russell Sage College

Spain, James Dorris, *Visiting Professor of Chemistry.* BS, Michigan Technological University, 1951; MS, Medical College of Virginia, 1953; PhD, Stanford University, 1956

Sparks, Elisa Kay, *Director of Composition and Rhetoric; Assistant Professor of English.* BA, Bryn Mawr College, 1973; PhD, Indiana University, 1979

Sparks, Peter Robert, *Associate Professor of Civil Engineering and Engineering Mechanics.* BS, University of Bristol (England), 1968; PhD, University of London, 1974

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*On Leave.

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Spencer, Harold Garth, *Professor of Chemistry.* BSE, 1952, MS, 1958, PhD, 1959, University of Florida

Spitzer, John Carlisle, *Associate Professor of Animal Science.* BS, 1969, MS, 1974, PhD, 1975, Colorado State University

Spragins, John Diggs, *Professor of Electrical and Computer Engineering.* BSEE, Oklahoma State University, 1956; MS, 1958, PhD, 1964, Stanford University

Spray, Richard Allman, *Professor of Agricultural Engineering.* BS, 1966, MS, 1967, West Virginia University; PhD, University of Missouri, 1972

Spurlin, Stanford Ryan, *Assistant Professor of Chemistry.* BS, Wake Forest University, 1979; PhD, Iowa State University, 1984

Squires, William Harrison, Jr., *Assistant Professor of Military Science.* Maj., US Army; BS, U.S. Military Academy, 1970; MBA, University of South Carolina, 1977

Staaf, Robert James, *Professor of Marketing and Economics.* BA, Duquesne University, 1964; MA, University of Delaware, 1967; PhD, Temple University, 1971, JD, University of Miami, 1980

Stafford, Donald Bennett, *Associate Professor of Civil Engineering.* BS, 1961, MS, 1963, PhD, 1968, North Carolina State University; PE

Stahl, Michael John, *Head of Management Department; Professor of Management.* BS, State University of New York, 1969; MS, Air Force Institute of Technology, 1970; PhD, Rensselaer Polytechnic Institute, 1975

Stanford, Richard Alexander, *Adjunct Professor of Management.* BA, Furman University, 1965; PhD, University of Georgia, 1971

Stanley, Virginia Belcher, *Associate Professor of Education.* BS, Winthrop College, 1965; MEd, Clemson University, 1971; EdD, University of South Carolina, 1979

Stanton, Judith Phillips, *Assistant Professor of English.* BA, Randolph-Macon Woman's College, 1968; MA, 1969, PhD, 1978, University of North Carolina

Stanton, Lynn Arthur, *Associate Professor of Agricultural Economics and Rural Sociology, Pee Dee Research and Education Center.* BS, 1959, MS, 1961, Cornell University; PhD, Louisiana State University, 1970

Steadman, Mark Sidney, Jr., *Professor of English and Writer in Residence.* BA, Emory University, 1951; MA, 1956, PhD, 1963, Florida State University

Steiner, Pinckney Alston, *Associate Professor of Physics.* BS, University of Georgia, 1959; PhD, Duke University, 1965; Post Doctorate, University of Copenhagen, 1964-66

Steirer, William Frank, Jr., *Associate Professor of History.* BA, Gettysburg College, 1959; MA, 1962, PhD, 1972, University of Pennsylvania

Stephens, Benjamin Read, *Assistant Professor of Psychology.* BS, University of Georgia, 1979; PhD, University of Texas, 1985

Stevenson, Dennis Elliott, *Associate Professor of Computer Science.* BA, Eastern Michigan University, 1965; MS, Rutgers University, 1975

Stevenson, John Lovett, *Director of Honors Program; Professor of Parks, Recreation, and Tourism Management.* BS, Davidson College, 1952; BD, 1955, ThM, 1957, Union Theological Seminary; MA, 1967, PhD, 1968, Indiana University

Stewart, Harry Eugene, *Professor of French.* BA, DePauw University, 1953; MA, 1956, PhD, 1961, Indiana University

Stillwell, Ephraim Posey, Jr., *Professor of Physics.* BS, Wake Forest University, 1956; MS, 1958, PhD, 1960, University of Virginia

Stillwell, Jean Glocker, *Lecturer in Geology.* BA, Gettysburg College, 1958

Stine, Karen Elizabeth, *Assistant Professor of Management.* BS, College of William and Mary, 1978; MS, University of Virginia, 1980; PhD, University of North Carolina, 1984

Stockham, James Allen, *Associate Professor of Visual Arts.* BFA, 1970, MFA, 1973, Wayne State University

Stockunas, Peter William, *Assistant Professor of Military Science.* Maj., U.S. Army; BA, Alfred University, 1970; MS, University of Southern California, 1976; MA, Webster College, 1978

Stone, Dewitt Boyd, *Coordinator, Clemson at Greenville TEC Program; Lecturer in Engineering.* BS, 1962, MS, 1964, University of Tennessee; PhD, Louisiana State University, 1969

Strand, Michael Ray, *Assistant Professor of Entomology.* BS, 1980, PhD, 1985, Texas A&M University

Straup, Robert Allen, *Adjunct Assistant Professor of Bioengineering.* BS, Lehigh University, 1969, DMD, Medical University of South Carolina, 1977

Strickland, Michael Burgess, *Instructor in English.* BA,.1976, MA, 1983, Clemson University

Stringer, William Clayton, *Associate Professor of Agronomy and Soils.* BSA, 1968, MS, 1972, University of Georgia; PhD, Virginia Polytechnic Institute and State University, 1979

Stroup, David James, *Assistant Professor of Biology.* BS, 1972, MS, 1975, PhD, 1980, University of Akron

Sturgis, Eugenie Ventre, *Instructor in Mathematical Sciences.* BS, 1945, MS, 1949, Louisiana State University

Sturkie, Douglas Kinly III, *Associate Professor of Sociology.* BA, Newberry College, 1970; MSW, University of South Carolina, 1973; PhD, University of Southern California, 1979

Stutzenberger, Fred John, *Professor of Microbiology.* BS, Bellarmine-Ursuline College, 1962; MS, University of Houston, 1964; PhD, Michigan State University, 1967

Suggs, Henry Lewis, *Assistant Professor of History.* BA, 1963, MA, 1968, North Carolina Central University; PhD, University of Virginia, 1976

Sullivan, John Russell, *Visiting Associate Professor of Mathematical Sciences.* BA, 1939, MA, 1949, Georgetown University

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Surak, John Godfrey, *Associate Professor of Food Science.* BS, 1971, MS, 1972, PhD, 1984, University of Wisconsin

Surver, William Merle, *Associate Professor of Biology.* BS, St. Francis College, 1966; PhD, University of Notre Dame, 1974

Sutton, Russell Wayne, *Professor of Agricultural Economics and Rural Sociology.* BS, 1963, MS, 1967, PhD, 1974, University of Kentucky

Swanson, David Mitchell, *Associate Professor of Management and Economics.* BS, University of North Carolina, 1966; MA, University of Chicago, 1969; PhD, University of North Carolina, 1972

Sweeney, John Robert, *Professor of Wildlife.* BS, 1967, MS, 1971, University of Georgia; PhD, Colorado State University, 1975

Sweeny, Thomas Estes, *Assistant Professor of Agricultural Education.* BA, Knox College, 1969; MA, University of Rhode Island, 1981

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Syme, John Hutton, *Lecturer in Forestry.* BS, Oregon State University, 1951

Tagliarini, Gene Arthur, *Instructor in Computer Science.* BA, 1970, MA, 1971, University of South Florida

Tainter, Franklin Hugh, *Professor of Forestry.* BSF, University of Montana, 1964; MS, 1968, PhD, 1970, University of Minnesota

Talbert, David Michael, *Reference Librarian; General Librarian.* BA, Davidson College, 1965; MS, University of Maryland, 1970; MLS, University of North Carolina, 1986; PhD, Clemson University, 1981

Tanner, Gloria Ann, *Professor of Nursing.* BSN, Mount Saint Agnes College, 1956; MSN, University of Maryland, 1964; EdD, Columbia University Teachers College, 1974

Taras, Michael Andrew, *Head of Forestry Department; Professor of Forestry.* BS, 1942, MF, 1948, Pennsylvania State University; PhD, North Carolina State University, 1965

Taylor, Eleanor Perry, *Adjunct Instructor in Nursing.* BS, Alfred University, 1963; MS, Clemson University, 1983

Taylor, Gareth Stephen, *Assistant Professor of Management.* BA, 1974, MA, 1977, University of Virginia; MBA, 1981, PhD, 1985, Virginia Polytechnic Institute and State University

Taylor, Theodore David, *Associate Professor of Ceramic Engineering.* BS, Alfred University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University

Tesolowski, Dennis Gregory, *Associate Professor of Industrial Education.* BS, 1967, MS, 1968, University of Wisconsin; EdD, Auburn University, 1978

Thames, Brenda Jumper, *Lecturer in Home Economics.* BS, Mississippi State University, 1976

Thies, Mark Charles, *Assistant Professor of Chemical Engineering.* BChE, Georgia Institute of Technology, 1977; PhD, University of Delaware, 1985; PE

Thomas, Claude Earl, *Adjunct Professor of Plant Pathology and Physiology.* BS, Wofford College, 1962; MS, 1964, PhD, 1966, Clemson University

Thomas, Ronald Lewis, *Associate Professor of Food Science.* BS, Gardner-Webb College, 1973; MS, 1975, PhD, 1980, Clemson University

Thompson, Carl Eugene, *Professor of Animal Science.* BS, 1963, MS, 1968, Pennsylvania State University; PhD, Virginia Polytechnic Institute and State University, 1971

Thompson, Carl Stassen, *Professor of Agricultural Economics and Rural Sociology.* BS, MS, 1968, Murray State University; PhD, University of Kentucky, 1973

Thompson, Gerald Richard, *Assistant Dean, College of Commerce and Industry; Professor of Economics.* BA, University of South Florida, 1966; PhD, University of Virginia, 1972

Thompson, John William, *Visiting Instructor in English.* BA, Vanderbilt University, 1964; MA, Duke University, 1965; MA, University of Georgia, 1981

Thompson, Regina, *Assistant Professor of Nursing.* BS, Bluefield State College, 1951; MA, Columbia University, 1958

Thompson, Sharon Wolff, *Assistant Professor of Nursing.* BSN, Murray State University, 1968; MSN, University of Kentucky, 1972

Thurmond, James Strom, *Adjunct Professor of Political Science.* BS, Clemson University, 1923

Thurmond, Nancy Moore, *Adjunct Professor of Nursing.* BA, University of South Carolina, 1968

Thurston, Ronald James, *Professor of Poultry Science.* BA, 1966, MS, 1969, University of Arkansas; PhD, University of Missouri, 1976

Tillinghast, David Charles, *Associate Professor of English.* BA, Louisiana Tech University, 1961, MA, University of Wisconsin, 1963; PhD, University of South Carolina, 1974

Timms, Janet Lee, *Visiting Instructor in Nursing.* BS, 1981, MS, 1986, Clemson University

Tinsley, Maurice, *Instructor in Economics.* BS, 1983, MA, 1985, Clemson University

Tinsley, William Allan, *Professor of Agricultural Economics and Rural Sociology.* BS, 1956, MS, 1960, University of Illinois; PhD, University of Minnesota, 1963

Tisue, Thomas G, *Associate Professor of Chemistry.* BS, Beloit College, 1961; PhD, Yale University, 1966

Titus, Sylvia Smith, *Instructor in English.* BA, Southwestern State College, 1968; MA, Oklahoma State University, 1970

Titus, Terry Charles, *Professor of Food Science.* BS, Washington State University, 1963; MS, 1969, PhD, 1970, Oklahoma State University

Toler, Joe Ernest, *Instructor in Experimental Statistics.* BS, 1966, MSA, 1968, University of Georgia

Tonkyn, David William, *Assistant Professor of Biological Sciences.* BA, 1976, MA, 1978, PhD, 1981, Princeton University

Tool, Dennis Casler, *Instructor in English.* BA, University of Mississippi, 1972; MFA, University of Arkansas, 1980

Torrence, Alan Kendrick, *Head of Agricultural Chemical Services Department; Lecturer in Food Science.* BS, Davidson College, 1965; PhD, Clemson University, 1971

Torres, Sixto Efron, *Assistant Professor of Spanish.* BS, 1968, MA, 1972, Kent State University; PhD, Florida State University, 1980

Townsend, Patricia Ann, *Instructor in Nursing.* BS, Clemson University, 1979; MN, University of South Carolina, 1981

Trapnell, Jerry Eugene, *Director of School of Accountancy; Professor of Accounting.* BS, 1968, MS, 1970, Clemson University; PhD, University of Georgia, 1977

Trent, Buford Earl, *Director of University Union and YMCA; Associate Professor of Recreation and Park Administration.* BA, Wofford College, 1956; MEd, Springfield College, 1961

Tunk, Enar Ahmet, *Visiting Lecturer in Industrial Engineering.* BS, Bogazici University, 1978; MS, Clemson University, 1982

Turk, Donald Earle, *Professor of Food Science.* BS, 1953, MNS, 1957, Cornell University; PhD, University of Wisconsin, 1960

Turlington, John McRae, *Visiting Instructor in English.* BA, University of North Carolina, 1983; MA, Clemson University, 1986

Turner, Albert Joseph, Jr., *Head of Computer Science Department* BS, 1961, MS, 1966, Georgia Institute of Technology; MS, 1972, PhD, 1976, University of Maryland

Turner, Allen Edward, *Assistant Professor of Electrical and Computer Engineering.* BS, 1977, MS, 1980, University of South Florida; PhD, Purdue University, 1986

Turner, Elaine Curry, *Assistant Professor of Food Science.* BS, 1982, MS, 1985, Purdue University

Turner, James Alexander, Jr., *Professor of Accounting.* BS, University of North Carolina, 1961; JD, University of South Carolina, 1966; CPA

Turner, James David, *Adjunct Assistant Professor of Zoology.* BS, Wake Forest University, 1973; PhD, Duke University, 1978

Turner, Raymond Clyde, *Professor of Physics.* BS, Carnegie Institute of Technology, 1960; PhD, University of Pittsburgh, 1966

Turnipseed, Samuel Guy, *Professor of Entomology, Edisto Research and Education Center.* BA, University of North Carolina, 1956; MS, Clemson University, 1958; PhD, North Carolina State University, 1961

Ulbrich, Carlton Wilbur, *Acting Head of Physics Department; Professor of Physics.* BS, 1960, MS, 1962, PhD, 1965, University of Connecticut

Ulbrich, Holley Hewitt, *Professor of Economics.* BS, 1960, MS, 1962, PhD, 1965, University of Connecticut

Undersander, Daniel John, *Associate Professor of Agronomy and Soils.* BS, University of Minnesota, 1972; MS, 1974, PhD, 1975, Purdue University

Underwood, Richard Allan, *Professor of English.* BA, 1955, MA, 1967, PhD, 1970, University of Michigan

Usrey, Malcolm Orthell, *Associate Professor of English.* BA, Abilene Christian College, 1951, MA, 1956, PhD, 1963, Texas Tech University

Uysal, Muzaffer, *Assistant Professor of Parks, Recreation, and Tourism Management.* BS, Ankara Academy of Economics and Commercial Sciences, 1976; MBA, University of New Haven, 1979; PhD, Texas A&M University, 1983

Vander Mey, Brenda Joyce, *Assistant Professor of Sociology.* BA, Trinity Christian College, 1978; MA, 1981, PhD, 1984, Mississippi State University

Van Lear, David Hyde, *Robert Adger Bowen Professor of Forestry.* BS, 1963, MS, 1965, Virginia Polytechnic Institute and State University; PhD, University of Idaho, 1969; Post Doctorate, University of Florida, 1968-69

Varenhorst, Glenn Elmer, *Professor of Planning Studies.* BA, 1949, MPA, 1952, University of Kansas; MS, University of Wisconsin, 1965; AIP

Vatalaro, Michael Vincent, *Associate Professor of Visual Arts.* BFA, University of Akron, 1972; MFA, Alfred University, 1976

Vaughan, Christopher Leonard, *Associate Professor of Bioengineering.* BS, Rhodes University, 1974; PhD, University of Iowa, 1980

Vaughn, Edward Allen, *Director of School of Textiles; Professor of Textiles.* BS, Lynchburg College, 1962; MS, Institute of Textile Technology, 1964; PhD, Victoria University of Manchester (England), 1969

Verry, William Robert, *Visiting Associate Professor of Mathematical Sciences.* BA, Reed College, 1955; BS, Portland State University, 1957; MA, Fresno State University, 1960; PhD, Ohio State University, 1972

Vines, Dwight Theodore, *Associate Professor of Dairy Science.* BS, 1968, MS, 1972, University of Arkansas; PhD, Michigan State University, 1976

Voelker, Evelyn Cecilia, *Professor of Art and Architectural History.* BA, Marymount College, 1958; MA, Catholic University, 1960; PhD, Syracuse University, 1977

Vogel, Henry Elliott, *Dean, College of Sciences; Professor of Physics.* BS, Furman University, 1948; MS, 1950, PhD, 1962, University of North Carolina

Von Recum, Andreas Freiherr, *Head of Bioengineering Department; Professor of Bioengineering.* BS, University of Giessen (Germany), 1964; DVM, 1968, DMVet, 1969, Free University of Berlin; PhD, Colorado State University, 1974

Von Rosenberg, Joseph Leslie, Jr., *Professor of Chemistry.* BA, 1954, PhD, 1963, University of Texas

Waddle, Gerald Lee, *Head of Marketing Department; Professor of Marketing.* BA, Baldwin-Wallace College, 1965; MBA, Kent State University, 1968; PhD, University of South Carolina, 1973

Wagner, Charles Kenyon, *Associate Professor of Biology.* BA, Emory University, 1965; MS, 1968, PhD, 1973, University of Georgia

Wagner, Donald Finch, *Associate Professor of Horticulture.* BS, 1963, MS, 1965, PhD, 1968, Iowa State University

Wagner, John Robert, *Assistant Professor of Geology.* BS, Muhlenberg College, 1970; MEd, 1972, MA, 1976, Temple University

Wainscott, Stephen Henry, *Associate Professor of Political Science.* BA, St. Andrews Presbyterian College, 1967; MA, 1972, PhD, 1976, Miami University

Walker, Gerald Lee, *Associate Professor of Architecture.* BArch, Clemson University, 1966; MCP, University of Pennsylvania, 1969

Walker, John Henry, *Professor of Education.* BS, Southwest Missouri State College, 1959; MRE, 1962, DRE, 1966, Southwestern Baptist Theological Seminary; MA, Furman University, 1969; PhD, University of Texas, 1973

Walker, Nancy Hilton, *Assistant Professor of Agronomy and Soils.* BA, Emory University, 1967; PhD, Clemson University, 1982

Wall, John, *Visiting Assistant Professor of Planning Studies.* BS, 1978, MCRP, 1980, Clemson University

Wall, Tommy Tyler, *Assistant Professor of Military Science.* Capt., U.S. Army; BA, Clemson University, 1976

Wallace, Myles Stuart, *Professor of Economics.* BA, 1968, MA, 1974, PhD, 1976, University of Colorado

Wallace, Susan Ulmer, *Associate Professor of Agronomy and Soils.* BS, 1973, MS, 1975, University of Alabama; PhD, Iowa State University, 1979

Wallenius, Kenneth Ted, *Professor of Mathematical Sciences.* BA, 1954, MA, 1955, University of Southern California; PhD, Stanford University, 1964

Waller, Robert Alfred, *Dean, College of Liberal Arts; Professor of History.* BA, Lake Forest College, 1953; MA, 1958, PhD, 1963, University of Illinois

Walsh, Terese Ann, *Instructor in Forestry.* BS, Iowa State University, 1984; MS, Virginia Polytechnic Institute and State University, 1986

Wang, Samuel, *Professor of Visual Arts.* BA, Augustana College, 1964; MFA, University of Iowa, 1966

Wang, Ting, *Assistant Professor of Mechanical Engineering.* BS, Tatung Institute of Technology (Taiwan), 1977; MS, State University of New York, 1980; PhD, University of Minnesota, 1984

Wannamaker, John Murray, *Professor of Accounting.* BS, 1950, MS, 1960, University of South Carolina; PhD, Louisiana State University, 1966; CPA, CMA

Wannamaker, Patricia Walker, *Associate Professor of German.* BA, 1950, MA, 1958, University of South Carolina; PhD, Louisiana State University, 1964

Ward, Carol Marie, *Assistant Professor of English.* BA, 1973, MA, 1976, University of South Carolina; PhD, University of Tennessee, 1981

Ward, Jeanne Ellen, *Adjunct Associate Professor of Nursing.* BS, St. Joseph's College, 1982

Warner, Daniel Douglas, *Professor of Mathematical Sciences.* BS, 1965, MA, 1966, Arizona State University; PhD, University of California, 1974

Warner, John Terry,* *Professor of Economics.* BA, Wake Forest University, 1969; ME, 1972, PhD, 1976, North Carolina State

Warner, Richard Dudley, *Acting Head of Earth Science Department; Associate Professor of Earth Science.* BS, Massachusetts Institute of Technology, 1966; PhD, Stanford University, 1971

Wates, Wylma, *Adjunct Professor of History.* BA, Coker College, 1948; MA, Emory University, 1951

Watford, Bevlee Artis, *Assistant Professor of Industrial Engineering.* BS, 1981, MS, 1983, PhD, 1985, Virginia Polytechnic Institute and State University

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Weatherford, David Edgar, Jr., *Extension 4-H and Youth Development Specialist; Associate Professor of 4-H and Youth Development.* BS, 1972, MEd, 1978, University of Georgia; EdD, North Carolina State University, 1981

Webb, Byron Kenneth, *Dean and Director of Cooperative Extension Service; Professor of Agricultural Engineering.* BS, 1955, MS, 1962, Clemson University; PhD, North Carolina State University, 1966; PE

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*On leave

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Wells, Gary James, *Professor of Agricultural Economics and Rural Sociology.* BA, University of North Carolina, 1973; ME, 1974, PhD, 1977, North Carolina State University

Welter, John Finlay, *Associate Professor of Poultry Science.* BS, 1951, MS, 1964, Clemson University

Welton, Ralph Edward, Jr., *Assistant Professor of Accounting.* BA, Anderson College, 1976; MS, 1978, PhD, 1982, Louisiana State University

Wenner, Elizabeth Lewis, *Adjunct Assistant Professor of Fisheries.* BS, Mary Washington College, 1972; MA, 1975, PhD, 1979, College of William and Mary

Wentworth, William Martin, *Associate Professor of Sociology.* BA, Indiana University, 1972; MA, University of Maryland, 1974; PhD, University of Virginia, 1978

West, William Elmer, *Director of Educational Services; Professor of Industrial Education.* BS, Ohio University, 1958; MA, 1964, PhD, 1969, Ohio State University

Westall, James Mason, Jr., *Associate Professor of Computer Science.* BS, Davidson College, 1968; PhD, University of North Carolina, 1973

Westcott, Simon Wickes III, *Visiting Assistant Professor of Plant Pathology and Physiology.* BS, University of Delaware, 1973; MS, North Carolina State University, 1975; PhD, Cornell University, 1986

Wetsel, Margaret Ann, *Assistant Professor of Nursing.* BS, Indiana University, 1978; MS, Ohio State University, 1979; PhD, University of Texas, 1986

Wheeler, Alan Dexter, *Instructor in Management.* BBA, University of Massachusetts, 1950; MBA, West Texas State University, 1969

Wheeler, Alfred Portius, *Associate Professor of Zoology.* BS, Butler University, 1969; PhD, Duke University, 1975

Whetstone, Jack Moorer, Jr., *Assistant Professor of Fisheries.* BS, 1975, MS, 1978, Clemson University

White, Charlie Raymond, Jr., *Associate Professor of Recreation and Park Administration.* BS, North Carolina State University, 1966; MS, Indiana University, 1967

White, Mervin Forrest, *Associate Professor of Sociology.* BS, 1962, MS, 1965, Brigham Young University; PhD, University of Kentucky, 1971

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Whitley, Melvin Douglas, *Instructor in Textiles.* BS, 1971, MS, 1973, North Carolina State University

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Whitwell, Ted, *Associate Professor of Horticulture.* BS, University of Tennessee, 1972; MS, 1974, PhD, 1977, Oklahoma State University

Wigginraad, Jacobus Frederikus, *Visiting Instructor in Mechanical Engineering.* BS, 1966, MS, 1974, Technical University of Delft (Holland)

Wiggins, Emily Sutherland, *Associate Professor of Home Economics.* BS, 1959, MAT, 1969, Winthrop College; EdD, University of Georgia, 1984

Wilkinson, Nancy Smith, *Lecturer in Education.* BA, Florida State University, 1963; MEd, Clemson University, 1972

Willey, Edward Parker, *Associate Professor of English.* BA, 1955, MA, 1957, PhD, 1968, University of North Carolina

Williams, Janice Gale, *Assistant Professor of Psychology.* BA, 1980, MA, 1982, Wake Forest University; PhD, Vanderbilt University, 1985

Williams, Mary Kellen, *Visiting Instructor in English.* BA, Central Missouri State University, 1982; MA, Clemson University, 1985

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Williams, Woodie Prentiss, Jr., *Head of Food Science Department; Professor of Food Science.* BS, 1953, MS, 1957, Mississippi State University; PhD, Texas A&M University, 1960

Williamson, Robert Elmore, *Professor of Agricultural Engineering.* BS, 1959, MS, 1964, Clemson University; PhD, Mississippi State University, 1972; PE

Willingham, Russell, *Instructor in French.* BA, Clark College, 1963; MA, Atlanta University, 1967

Willis, Naomi Honeycutt, *Instructor in Home Economics.* BS, Mars Hill College, 1964; MEd, Clemson University, 1985

Winchell, Mark Royden, *Associate Professor of English.* BA, 1971, MA, 1973, West Virginia University; PhD, Vanderbilt University, 1978

Wininger, Melvin Ray, *Visiting Instructor in English.* BA, Bob Jones University, 1979; MA, Clemson University, 1986

Witcher, Wesley, *Professor of Plant Pathology and Physiology.* BS, 1949, MS, 1958, Virginia Polytechnic Institute; PhD, North Carolina State University, 1960

Witherspoon, Gayland Brooks, *Professor of Architecture.* BArch, University of Arkansas, 1956; MSArch, University of Illinois, 1962; AIA

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M. M. Sinka, *Chairperson*

FACULTY SENATE

L. A. Dyck, *President;* J. C. Mullins, *Vice President;* M. N. Sly, *Secretary;* W. Baron, G. P. Birrenkott, Jr., S. H. Brown, D. Y. Brannock, E. L. Bryan, R. J. Calhoun, G. E. Carter, R. A. Conover, Jr., J. H. Daniels, A. M. Derr, M. J. Drews, W. R. Hare, Jr., G. M. Haselton, R. L. Hedden, M. R. Hudson, C. O. Huey, Jr., B. F. Jenny, S. C. King, J. G. LaTorre, T. L. Leap, D. E. Linvill, T. A. Lyson, J. C. McConnell, Jr., A. W. Madison, L. G. Mahrer, M. A. Morris, J. C. Mullins, R. H. Nowaczyk, G. M. Polk, Jr., M. B. Reichenbach, R. W. Snelsire, E. P. Stillwell, Jr., D. G. Tesolowski, J. D. Woodard

Administration of Business and Financial Affairs

David R. Larson, MBA, *Vice President for Business and Finance*

BUDGETS AND PLANNING

Alden L. McCracken, BS, *Assistant Vice President, Budgets and Planning*
William F. Geer, Jr., BS, *Supervisor, Grants Contract Services*
Gary M. McCombs, BS, *Director, Business Systems Development*
James T. Roberts, BS, *Budget Director*

BUSINESS MANAGEMENT

John C. Newton, MA, *Assistant Vice President, Business Services*
James M. Boleman, Jr., BS, *Director, Purchasing*
Steven E. Copeland, BA, *Business Manager*
Randal M. Davis, *Telecommunications Manager*
Linda J. Rice, *Risk Manager*

FACILITIES PLANNING AND MANAGEMENT

Jack N. Wilson, BA, *Assistant Vice President, Facilities Planning and Management*
Daniel J. Boyer, MArch, *Superintendent, Planning and Engineering*
James T. Shanahan, MBA, *Business and Finance Analyst*
Walter D. Stone, Jr., MS, *Director, Physical Plant*
Mark A. Wright, MCRP, *Campus Master Planner*

FINANCIAL MANAGEMENT

Thomas A. Harbin, MACC, CPA, *Assistant Vice President, Financial Management*
John R Anderson, BA, *Manager, Accounts Receivable*
Ronald T. Herrin, *Director, Payroll Employee Benefit Programs*
Coy H Howard, *Supervisor, Accounts Payable*
Ralph M. Kesler, *Bursar*
Charles A. Tegen, BA, CPA, *Director, Financial Information and Reporting*
William A. Thompson, BS, *Controller*

MANAGEMENT SERVICES

Sandra J. Underwood, *Planning and Research Coordinator*

PERSONNEL SERVICES

Ray L Thompson, BS, *Director, Personnel Services*

Administration of Institutional Advancement

Walter T Cox, BS, *Acting Vice President for Institutional Advancement*
George M. Moore, BS, *Associate Vice President*
H. Betts Wilson, BS, *Executive Assistant to the Vice President*

ALUMNI RELATIONS AND RESOURCES DEVELOPMENT

George M. Moore, BS, *Executive Officer*
Caroline C. Busch, BS, *Director, Administrative Services*
Mark R. Eisengrein, MEd, *Director, Alumni Relations*
Bonnie B. Bennett, BA, *Alumni Field Representative*
Brian J O'Rourke, BS, *Alumni Field Representative*

DEVELOPMENT

Jeffrey P. McNeill, MS, *Associate Vice President for Development*
Donald E. Fowler, BS, *Assistant Vice President for Development*
Robert E. Christenberry, BS, *Director of Major and Planned Gifts*
Christine Y. Klugh, BS, *Donor Research Coordinator*
Paula E. Pecham, BA, *Coordinator, Gift Club*
Ann B. Smith, MS, *Director, Annual Giving*

UNIVERSITY RELATIONS

W. Harry Durham, MA, *Associate Vice President for University Relations*
John L. Allen, BA, *Director, Visitor Programs*
Deborah G. Dunning, *Director, Publications and Graphics Services*
Roger W. Koonce, BA, *Director, Electronic and Photographic Services*
Peter R. Pepinsky, BA, *Director, Agricultural Communications*
Margaret C. Pridgen, BA, *Editor, University Publications*
Catherine Sams, BA, *Acting Director, News Services*

CLEMSON UNIVERSITY ALUMNI ASSOCIATION, 1986-87

Officers

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Warren H. Owen, '47, Charlotte, North Carolina, *Vice President*
George M. Moore, '58, Clemson University, *Secretary*

National Council

Kenneth N. Vickery, '38, Clemson, South Carolina, *District 1*
William J. Neely, '58, Taylors, South Carolina, *District 2*
Erwin F. Abell, '60, Greenwood, South Carolina, *District 3*
John L. Easterling, Jr., '50, Spartanburg, South Carolina, *District 4*
Roger J. Troutman, '74, Rock Hill, South Carolina, *District 5*
Donald E. Golightly, '67, Columbia, South Carolina, *District 6*
Alan M. Tewkesbury, '77, Aiken, South Carolina, *District 7*
John F. McLeod, Jr., '52, Chesterfield, South Carolina, *District 8*
Jack Q. Gerrald, '55, Conway, South Carolina, *District 9*

J Ryan White, '42, Walterboro, South Carolina, *District 10*
John Q. Adams, '67, Charleston, South Carolina, *District 11*
Warren H. Owen, '47, Charlotte, North Carolina, *District 12*
Noel E. Garvin, '44, Greensboro, North Carolina, *District 13*
Dennis O. Hopf, '63, Stone Mountain, Georgia, *District 14*
Ted P. Pappas, '57, Jacksonville, Florida, *District 15*
R. Phillips Corker, '48, Signal Mountain, Tennessee, *District 16*
David L. Milling, '53, Aston, Pennsylvania, *District 17*
Joseph B. Blandford, '58, Arnold, Maryland, *District 18*
Dale W. Reynolds, '67, Houston, Texas, *District 19*
Leonard C. Butler, '53, Burlington, North Carolina, *Past President*
Jesse A. Boyce, '44, Greenwood, South Carolina, *Foundation Representative*
James C. Hite, '63, Clemson University, *Faculty Representative*
Billy M. Reaves, '50, Hartsville, South Carolina, *IPTAY Representative*
Lawrence V. Starkey, '56, Atlanta, Georgia, *IPTAY Representative*
Samuel F. Richey, '87, Clemson University, *President, Student Body*
Kevin N. Earnest, '88, Clemson University, *President, Student Alumni Council*
H. Patricia Hook, '84, Greenville, South Carolina, *President, Young Alumni Associates*
A. Max Lennon, Clemson University, *Ex Officio*
Caroline C. Busch, '74, Clemson University, *Ex Officio*
Mark R. Eisengrein, '78, Clemson University, *Ex Officio*
Walter T. Cox, '39, *Ex Officio*
George M. Moore, '58, Clemson University, *Ex Officio*

CLEMSON UNIVERSITY FOUNDATION, 1986-87

Officers

Billy G. Rogers, '49, Dillon, South Carolina, *President*
Philip H. Prince, '49, Pawleys Island, South Carolina, *Vice President*
George M. Moore, '58, Clemson, South Carolina, *Secretary*
Caroline C. Busch, '74, Clemson, South Carolina, *Treasurer*

Directors

George J. Bishop III, '52, Myrtle Beach, South Carolina
Jesse A. Boyce, '44, Greenwood, South Carolina
John J. Britton, '58, Sumter, South Carolina
W. Wright Bryan, '26, Clemson, South Carolina
Caroline C. Busch, '74, Clemson, South Carolina, *Ex Officio*
Leonard C. Butler, '53, Burlington, North Carolina
William L. Carpenter, Greenville, South Carolina
Henry C. Coleman, '26, Daytona Beach, Florida
Walter T. Cox, '39, Clemson, South Carolina, *Ex Officio*
I. L. Donkle, '49, Greenville, South Carolina
Robert M. Erwin, '59, Myrtle Beach, South Carolina
John M. Evans, '57, Spartanburg, South Carolina
T. Ed Garrison, '42, Anderson, South Carolina
W. Steve Griffith, Jr., '54, Charlotte, North Carolina
Frank S. Hanckel, '55, Charleston, South Carolina
James M. Henderson, '44, Greenville, South Carolina
Angelina S. Howard, '69, Marietta, Georgia
A. Max Lennon, Clemson, South Carolina, *Ex Officio*
Walter K. Lewis, '37, Hartsville, South Carolina
Thomas C. Lynch, '58, Clemson, South Carolina
Paul W. McAlister, '41, Laurens, South Carolina
H. Donald McElveen, '57, Columbia, South Carolina
William H. Mathis, '63, Atlanta, Georgia
Robert L. Matthews, '63, Atlanta, Georgia
David L. Milling, '53, Aston, Pennsylvania
James A. Milling, '27, Moorestown, New Jersey
Davis T. Moorhead, '54, Arlington, Virginia
George M. Moore, '58, Clemson, South Carolina, *Ex Officio*

Earle E. Morris, Jr., '49, Columbia, South Carolina
J. Wilson Newman, '31, Charlottesville, Virginia
William H. Orders, '48, Greenville, South Carolina
James V. Patterson, '51, Clemson, South Carolina
Philip H. Prince, '49, Pawleys Island, South Carolina
Harold B. Risher, '38, Spartanburg, South Carolina
Billy G. Rogers, '59, Dillon, South Carolina
James C. Self, Jr., '65, Greenwood, South Carolina
Currie B. Spivey, '58, Greenville, South Carolina
Lawrence V. Starkey, '56, Atlanta, Georgia

Administration of Student Affairs

Manning N. Lomax, BS, *Acting Vice President for Student Affairs and Dean of Students*
Bobby J. Skelton, PhD, *Assistant Vice President for Student Affairs and Dean of Admissions and Registration*
Walter A. Mayfield, MEd, *Systems Analyst*

ADMISSIONS AND REGISTRATION

Bobby J. Skelton, PhD, *Assistant Vice President for Student Affairs and Dean of Admissions and Registration*
T. Frank Gentry, MEd, *Executive Assistant*

ADMISSIONS

W. Richard Mattox, MS, *Director*
Michael R. Heintze, PhD, *Associate Director*
Otis D. Nelson, MA, *Director, International Services*
Robert S. Barkley, *Assistant Director*
Nancy Y. Curry, BS, *Counselor*
Deborah G. Ervin, BA, *Assistant Director*
Leila R. Landrum, BS, *Counselor*
Debra C. Sparacino, MEd, *Academic Credits Evaluator*

ATHLETIC STAFF

Robert W. Robinson, BS, *Director*
S. Len Gough, BS, *Associate Athletic Director*
Van P. Hilderbrand, BS, *Assistant Athletic Director*
Fred W. Hoover, BS, *Assistant Athletic Director*
V. Dwight Rainey, MS, *Associate Athletic Director*
R. Allison Dalton, MS, *Executive Secretary, IPTAY*
Robert C. Bradley, BS, *Director, Sports Information*
Robert E. Ricketts, BS, *Assistant Athletic Director*
Billy H. Wilhelm, BA, *Head Coach, Baseball*
Clifford R. Ellis, MA, *Head Coach, Basketball*
Annie S. Tribble, MEd, *Head Coach, Women's Basketball*
R. Wayne Coffman, BS, *Head Coach, Women's Cross Country*
Danny L. Ford, MA, *Head Coach, Football*
Larry B. Penley, BS, *Head Coach, Golf*
Ibrahim M. Ibrahim, PhD, *Head Coach, Soccer*
Gary A. Wade, BS, *Head Coach, Strength*
George R. Boettner, MS, *Head Coach, Men's and Women's Swimming*
Wayne R. Norris, BS, *Head Coach, Women's Volleyball; Assistant Swimming*
Eddie L. Griffin, MEd, *Head Coach, Wrestling*

BOOKSTORE

John C. Cureton, *Manager*

CAREER SERVICES

Alfred Mathiasen, Jr., MS, *Director, Career Services and Placement*
Marty H. Williams, MS, *Director, Cooperative Education*

COUNSELING AND CAREER PLANNING

Judith E. Haislett, PhD, *Director*
Barbara M. Foltz, MA, *Psychologist*
Galen H. Steele, PhD, *Psychologist*
Michael L. Vinson, PhD, *Psychologist*
Vickie E. Bush, MA, *Counselor*

FINANCIAL AID

Marvin G. Carmichael, MEd, *Director*
Miriam G. Wilson, BA, *Assistant Director*

HOUSING

Almeda Rogers, MEd, *Director*
Verna G. Howell, MEd, *Director, Residential Life*
Jeffery S. Martin, MEd, *Director, Clemson House; Coordinator, Summer Conference*
Gregory S. Padgett, BA, *Director, Residential Services*
John R. Brown, BS, *Coordinator, Special Projects*
Kent A. Buchanan, MEd, *Assistant Director, Residential Life*
Gary E. Campbell, MEd, *Associate Director, Residential Life*
Cynthia C. Cooley, BS, *Coordinator, Assignments and Records*
Gary V. Gaulin, BA, *Associate Director, Residential Services*
Phillip A. Howard, MEd, *Assistant Director, Residential Life*
Edward A. Singleton, BA, *Associate Director, Residential Services*

LITTLEJOHN COLISEUM

George L. Jones, *Manager; Groundskeeping Supervisor*

MUSIC ACTIVITIES

John H. Butler, EdD, *Director, Music Activities and Manager of Concert Series*
Mark N. Jessie, MMus, *Director, Choral Activities*
Bruce F. Cook, DMA, *Director, Bands*
Richard E. Goodstein, PhD, *Assistant Director, Bands*

REGISTRATION

Stanley B. Smith, Jr., MA, *Registrar*
Frances H. Blair, BS, *Assistant Registrar*
Alice H. Allen, MEd, *Publications Editor*
David B. Fleming, MAgEd, *Schedule Coordinator*
Jerry A. Jordan, BS, *Operation Manager*
Judith A. Ray, *Recorder*

STUDENT HEALTH SERVICE

Robert H. Burley, MD, *Director*
G. Stuart Clarkson, MD, *Clinical Director, Physical Medicine*
Spurgeon N. Cole, PhD, *Psychologist*
John D. Davenport, PhD, *Psychologist*
William V. Griffith, MD, *Physician*
Byron B. Harder, MD, *Physician and Team Physician*
Lake H. Jameson, Jr., MD, *Physician*
Rose M. McDonald, MD, *Physician*
Sandra C. Smith, RN, *Director, Nurses*

STUDENT LIFE OFFICE

Joy S. Smith, MEd, *Dean*
Kirk A. Brague, MEd, *Associate Dean*
Teresa P. Evans, MEd, *Assistant Dean*
Alexander C. Lewis, MA, *Assistant Dean*
Michael L. Schardein, MEd, *Assistant Dean*
Bonnie W. Stevens, MRPA, *Assistant Dean*

UNIVERSITY UNION

Buford E. Trent, MEd, *Director*
Michael A. Arnold, BS, *Assistant Director, Programs*
Ina B. Durham, BS, *Director, Information Center*
Anita K. Garrett, BS, *Director, Business*
Rondeau G Laffitte III, MEd, *Assistant Director, Programs and Services*
Cynthia F. Robinson, BS, *Assistant Program Director*

Public Service Activity

COLLEGE OF EDUCATION

Office of Educational Services and Placement

B. Verner Burkett, PhD, *Director, Spring/Summer*
William E. West, PhD, *Director, Fall*

Joseph H Adair, MEd
Clayton V Aucoin, PhD
Steward L Baylor, EdS
Dudley W Blair, PhD
Lloyd H Blanton, PhD
Joel V Brawley, PhD
A DeWayne Brooks, EdD
Sam L Buckner, EdD
B. Verner Burkett, PhD
Paul C Caley, PhD
William F Chappell, BA
Gordon D Chipukites, MEd
Thomas F Collins, MS
W Owens Corder, EdD
J Page Crouch, EdD
James H Daniels, EdD
Jean L Dickey, PhD
G Franklin Elrod, PhD
Daniel Frye, MInEd
Donald L Fuhr, PhD
Elizabeth B Galloway, EdD
Barbara A Grant, EdD
Gordon W Gray, EdD
Robert P Green, EdD
Barbara J Griffin, PhD
John V Hamby, PhD
John C Harden, Jr , MA
William R Hare, PhD
Robert Hatchette, PhD
Robert E Haymond, PhD
Robert D Hefley, PhD
Doris R Helms, PhD
Shirley Holland, EdD
Paul T Holmes, PhD
Clinton H Isbell, EdD
Don F Keller, EdD
John W Kenelly, PhD
Ernest J Kozma, EdD
Kenneth Lake, MInED
Donald R LaTorre, PhD
William H Leonard, PhD
Gerald G. Lovedahl, PhD
Stanley M Lukawecki, PhD
Oliver R Lumpkin, PhD
Russell A Marion, PhD
George Mason, PhD
James E Matthews, EdD
R Jack Mercer, EdD
Margaret A Moore, PhD
Harvey E Morgan, EdD
Edward F Olive, EdD
Thomas H Parry, EdD
D Henry Pate, EdD
R Kenneth Peden, EdD
Wallace Peebles, MInEd
William W Pennscott, EdD
Chris L Peters, MEd
Barbara M Raetsch, EdD
Frederick C Raetsch, PhD
John C Richardson, EdD
Lucy Rollin, MA
Bruce L Sandberg, PhD
C Daniel Schmittou, EdS
Robert J Staaf, PhD
Virginia B Stanley, EdD
Dennis G Tesolowski, EdD
Patricia Tillotson, EdD
Henry E Vogel, PhD
John R Wagner, MEd
John H Walker, PhD
Kenneth T Wallenius, PhD
Gilbert G Woolard, EdD

The College of Education offers off-campus courses through the Office of Educational Services and Placement for school districts and other agencies in South Carolina. The following is an official record of the courses offered from the spring semester through the fall semester 1986.

ANDERSON

Spring	ASTR 732	Astronomy for Earth Science Teachers
	ED 632	Life Science and Earth Science for Grades 1-3*
	ED 634	Strategies and Techniques for Middle School Science Teachers*
	ED 677	Characteristics of Children Who are Gifted
	ED 798	Teaching Secondary School Reading
	MTHSC 700	Mathematical Computer Applications for Elementary Teaching
	MTHSC 710	Elementary Calculus from an Advanced Viewpoint
Summer	ED 480, 680	Educational Applications of Microcomputers
	ED 632	Principles and Processes of Elementary Physical Science*
	ED 759	Fundamentals of Basic Reading
Fall	ED 480, 680	Educational Applications of Microcomputers
	MTHSC 701	Number Systems for the Elementary Grades
	MTHSC 721	Matrix Algebra I
Summer	AGED 450, 650	Modern Topics and Issues Developing Shop Skills

BEAUFORT

Fall	INED 310	Methods of Trade Teaching
	INED 410, 610	Advanced Methods*

CAMDEN

Spring	INED 310	Methods of Trade Teaching
	INED 451	Special Projects
	INED 452, 652	Advanced Projects
Fall	INED 310	Methods of Trade Teaching
	INED 410, 610	Advanced Methods*
	INED 451	Special Projects
	INED 452, 652	Advanced Projects

CHARLESTON

Spring	INED 452, 652	Advanced Projects

CHESTER

Spring	COLED 482, 682	Advanced Educational Applications of Microcomputers

CLINTON

Fall	MTHSC 707	Mathematics for Middle School Teachers Algebra

COLUMBIA

Spring	AGED 736	Internship in Teaching
	INED 410, 610	Audio-Visual Aids for Teachers

CONWAY

Spring	INED 405, 605	Course Organization and Evaluation

FLORENCE

Summer	INED 410, 610	Developing Performance-Based Teaching Strategies*
Fall	INED 410, 610	Class and Laboratory Management*

GAFFNEY

Spring	INED 410, 610	Advanced Methods of Teaching*
	INED 452, 652	Advanced Projects

GEORGETOWN

Fall	INED 410, 610	Developing Performance-Based Teaching Strategies*

GREENVILLE

Spring	ECON 750	Economic Concepts and Classroom Applications for Teachers
	ED 632	Physical Education for Elementary School Teachers*
	ED 705	Foundations of Counseling and Guidance Services
	ED 721	Legal Phases of School Administration
	ED 798	Teaching Secondary School Reading
	ED 802	Human Development Psychology of Learning
	ED 811	School Finance
	ED 817	Development of Counseling Skills
	INED 405, 605	Course Organization and Evaluation
	INED 410, 610	Classroom and Laboratory Development*
	MTHSC 109	Algebra and Trigonometry for Teachers
	MTHSC 700	Mathematics Computer Applications for Elementary Teachers
	MTHSC 701	Number Systems for the Elementary Grades
	MTHSC 723	Applications of Linear and Modern Algebra
	MTHSC 771	Numerical Methods in Secondary School Mathematics
Summer	ED 762	Reading Diagnosis and Remediation
	ED 809	Analysis of the Individual
	INED 410, 610	Program Development in Vocational Education*
	MTHSC 110	Analytic Geometry for Teachers
Fall	ECON 750	Economic Concepts and Classroom Applications for Teachers*
	ED 431, 631	Early Childhood Education*
	ED 432, 632	Elementary Education*
	ED 634	Individual Testing II—Projective Techniques*
	ED 635	Middle School Curriculum*
	ED 720	School Personnel Administration
	ED 761	Reading Instruction in the Elementary School
	ED 794	School and Community Relationships
	ED 801	Seminar in Human Growth and Development
	ED 802	Human Development: Psychology of Learning
	ED 804	Advanced Methods of Teaching in the Elementary School
	ED 809	Analysis of the Individual
	ED 814	Field Experience in Elementary School Guidance
	ED 850	Public School Administration
	ED 889	Research in Education
	INED 480, 680	Eduational Applications of Microcomputers
	INED 496, 696	Public Relations
	INED 845	Curriculum Planning and Development in Industrial Education
	MTHSC 700	Mathematical Computer Applications for Elementary Teachers
	MTHSC 707	Mathematics for Middle School Teachers: Algebra
	MTHSC 710	Elementary Calculus from an Advanced Viewpoint
	MTHSC 719	Discrete Mathematics

GREENWOOD

Spring	ED 801	Seminar in Human Growth and Development
	ED 850	Public School Administration
	ED 871	Interpersonal and Group Relationships
	ED 889	Research in Education
Summer	ED 480, 680	Educational Applications of Microcomputers
	ED 705	Foundations of Counseling and Guidance Services
	ED 817	Development of Counseling Skills
	ED 830	Techniques of Supervision—the Public Schools
Fall	ED 480, 680	Educational Applications of Microcomputers
	ED 723	Field Experiences in Elementary Administration and Supervision
	ED 724	Field Experience in Secondary Administration and Supervision
	ED 725	Practicum in School System Administration and Supervision
	ED 808	Educational Tests and Measurements
	ED 813	Educational and Vocational Informational Service and Placement
	ED 889	Research in Education

HAMPTON

Fall	INED 410, 610	Developing Competency Based Teaching Strategies*
	INED 410, 610	Advanced Projects*

LIBERTY

Spring	ED 480, 680	Educational Applications of Microcomputers
Summer	ECON 750	Economic Concepts and Classroom Applications for Teachers
	ECON 751	Current Issues in Economics for Teachers
	ED 480, 680	Educational Applications of Microcomputers
Fall	ED 480, 680	Educational Applications of Microcomputers

NEWBERRY

Spring	ED 671	The Exceptional Child
Summer	ED 762	Reading Diagnosis and Remediation
	ENGL 700	Children's Literature for Teachers
Fall	ED 801	Seminar in Human Growth And Development

ORANGEBURG

Summer	AGED 428, 628	Special Studies in Agricultural Education

PENDLETON

Fall	ED 763	Middle School Reading
	ED 866	Psychology of Teaching Reading
	MTHSC 707	Mathematics for Middle School Teachers Algebra

PICKENS

Spring	ED 480, 680	Educational Application of Microcomputers
	MTHSC 761	Probability and Statistics for Teachers
Summer	MTHSC 730	Modern Geometry for Teachers
Fall	ED 762	Reading Diagnosis and Remediation

RIDGEVILLE

Spring	INED 410, 610	Developing Performance-Based Teaching Strategies*

SALUDA

Spring	ED 762	Reading Diagnosis and Remediation
Fall	ED 759	Fundamentals of Basic Reading

SENECA

Spring	ED 434, 634	Vocational Guidance for Prevocational Education Teachers*
	ED 434, 634	Current Practices in Alcohol and Drug Education and Prevention*
	ED 634	Individual Testing II—Projective Techniques*
	ED 634	Educational Procedures for the Gifted in Language Arts*
	ED 762	Reading Diagnosis and Remediation*
	MTHSC 701	Number Systems for the Elementary Grades*
Summer	ED 632	Physical Education for Elementary School Teachers*
	ED 635	K-6 Career Development—Technology Awareness Institute*
	INED 410, 610	Industrial Technology Education
	INED 410, 610	Institute in Flexography*
	INED 452, 652	Advanced Projects
	MTHSC 700	Mathematical Computer Applications for Elementary Teachers
Fall	ED 480, 680	Educational Applications of Microcomputers
	ED 632	Elementary Physical Science*
	ED 634	Current Practices in Alcohol and Drug Education Prevention*
	MTHSC 700	Mathematical Computer Applications for Elementary Teachers

SPARTANBURG

Spring	ED 634	Integrating Basic Skills into the Content Areas*
Summer	INED 410, 610	Modern Manufacturing Techniques*
Fall	INED 410, 610	Implementing Performance Based Vocational Education

WALTERBORO

Spring	INED 410, 610	Advanced Methods of Teaching*

WILLIAMSTON

Spring	INED 410, 610	Developing Performance-Based Teaching Strategies*
	ED 471, 671	The Exceptional Child
	ED 632	Science Content for Grades 1-8*

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*Special institute course

Student Register

BACHELORS' DEGREES CONFERRED MAY 9, 1986

COLLEGE OF AGRICULTURAL SCIENCES

LUTHER PERDEE ANDERSON, Dean

BACHELOR OF SCIENCE

Agricultural Economics and Rural Sociology

Alan Brian Ables	Westminster	*Timothy Dean Martin	Aynor
Franklin Jeffrey Cox	Greer	*Cathryn Speer McKinnell	Fairfax Station, Va.
John Dobson Dunavant	Memphis, Tenn.	*Raymond Thomas Vincent, Jr.	Laurel, Del.
Harvey Arlin Graham III	Loris	John Marion Wise	Blackville
Richard Alan Hill	Abbeville	*Gary Lynn Youmans	Furman

Agricultural Education

Henry Keith Cox	Loris	Mary Christie Rogers	Pendleton
John Timothy Farmer	Greer	Thomas Kevin Swartz	Wagener
Michael David Hall, Jr.	Taylors	Mark Guerry Wyndham	Fort Mill

Agricultural Mechanization and Business

John Francis Boazman	Newberry	Eugene Bradley McCutchen IV	Bishopville
**Walter Edward Corbin	Brunson	**James Gibson McKenzie	Furman
Todd Howard Fleming	Manning	John Forest McKenzie II	Charleston

Agronomy

*Gregory David Binford	Crawfordsville, Ind.	Sandra Rose Dundon	Muscatine, Iowa
Michael Dean Bruorton	Kingstree	William Haywood Furman	Bennettsville

Animal Industries

Albert Daniel Baldwin	Cordova	Martha Marie McElmurray	Jackson
Danielle Louise Bercier	Bayou Sarah, La.	Teresa Michelle Moore	Clemson
Zeb Everette Bost	Mt. Pleasant, N. C.	Allen Judson Price, Jr.	Abbeville
Brian Scott Bruce	Nashville, Tenn.	James Kenneth Rogers, Jr.	Pelzer
*Linda Faye Catoe	Lancaster	Claude Hutchinson Schumpert	Newberry
Charles Robert Hannah, Jr.	Abbeville	Laura Griffith Taylor	Greenville
Candace Ann James	Greenwood	Hampton Alva Whetsell III	Bowman
Kay Lucille Lindsay	North Augusta	William Robert Youngblood	Fort Mill

Economic Biology

Julia Anne Barron	Sumter	Christopher Wall Sample	Charleston
Paula Jane Clardy	Camden	James Donald Thomas, Jr.	Barnwell
Charles Michael Cranford	Rock Hill	William George Thomas	Gulfstream, Fla.
Frances Dorothea Guldner	Walhalla		

Food Science

*Barbara Angela Black	Saluda	Melanie Rose Chavers	Beaufort

Horticulture

Patty Craig Ables	Six Mile	Peter William Horn	New Paltz, N. Y.
David Lee Achey	Roswell, N. M.	John Fitzgerald Leucht	Woodstock, Ill.
Julie Ann Bennett	Norristown, Pa.	Ann Summers Perkins	Clemson
Suzanne Marie Boursault	Norristown, Pa.	Cynthia Kay Thomas	Greenville
Edward Allen Browder	Mt. Pleasant	Wayne King Vissage	Mountain Rest
John George Hastings	Miami, Fla.	Eric Kemper Wilson, Jr.	Cades

Pre-Professional Studies

*John Walter Warner	Moncks Corner

COLLEGE OF ARCHITECTURE

LAMAR HAMILTON BROWN, Acting Dean

BACHELOR OF ARTS

Design

Todd Edward Boggess	Princeton, W. Va.
Randy Donald Clamp	Lexington
Gary Katherine Collins	Pendleton
**James David Dawkins	Liberty, N. C.
Michael Gerard DeCrick	Harper Woods, Mich.
Scott Jay Duell	McDonough, N. Y.
Julia Lynn Floyd	Loris
Lynne Hunter Hickman	Clemson
Grady Dale Lee	Sumter
Donald Lewis Love, Jr.	Spartanburg
John Scot Macrae	Greenville
Dawn Louise Mayoros	Titusville, Fla.
Marian Hamilton Mitchell	Augusta, Ga.
Katherine Elizabeth Mullen	Sumter
Kris Adrienne Oburg	Kinnelon, N. J.
Kirby Eugene Pate	Atlanta, Ga.
Michael Austin Price	Stone Mountain, Ga.
Tay Lori Smith	Orangeburg
Shelly Elizabeth Williams	Merritt Island, Fla.

BACHELOR OF SCIENCE

Building Science and Management

*David Charles Buzzell	Gaithersburg, Md.
James Pearlie Creel, Jr.	Myrtle Beach
Kevin Earl Crosby	Goose Creek
Kevin Brian DeKold	Vero Beach, Fla.
Mark Patrick Dullea	Greenville
Donald Edwin Jackson, Jr.	Conyers, Ga.
Edgar Madison Jolley, Jr.	Signal Mountain, Tenn.
Edward Michael Klim	Center Line, Mich.
Leslie Loper	Bluffton
Jonathan Russell Masker	Chipley, Fla.
Michael Pennington Nierl	Pittsburgh, Pa.
Robert Theron Russell	Sumter
John Steven Wiggins	Clearwater, Fla.
Walter Lee Williams III	Jacksonville, Fla.

Design

Paul Hovis Allen	Greenville
Edward Whaley Bailey	Greenville
Samuel Decatur Beaird, Jr.	Spartanburg
Landra Cope	Weirsdale, Fla.
Kevin Brian DeKold	Vero Beach, Fla.
Deborah Marie Dent	West Columbia
*Roger Wade DeWeese	Jackson
Jeff Richard Fogle	Easley
Christine Ann Gagnon	Amesbury, Mass.
Deborah Lee Harper	Willingboro, N. J.
Rebecca Harrison	Aiken
David Matthew Hawke	Hilton Head Island
Thomas Wentz Hinkle	Cape Coral, Fla.
John Michael Hopkins	Atlanta, Ga.
David Standley Hyer	South Wales, N. Y.
Jonathon Scott Johnston	Clemson
*James E. Kennon, Jr.	Nashville, Tenn.
Steven Martin Lange	Park Ridge, N. J.
Stephen Earley Mackey	Lancaster
*Frank Arnold McClure III	Varnville
*Kay Ivah Moore	Greenville
Patrick Thomas Mumford	Sewall's Point, Fla.
William Alexander Nickles	Hartsville
Bandele Olayinka Oguntomilade	Lagos, Nigeria
***Charles David Piper	Greensboro, N. C.
*Roger A. Priest	Ft. Pierce, Fla.
Robert Wesley Rollins	Salisbury, Md.
David Craig Rushing	Lexington, Ky.
Dale Alan Schmidt	Fort Lauderdale, Fla.
Michael Craig Sherrill	Hilton Head Island
Alexander Felco Gerard Sipkes	San Diego, Cal.
Jeffrey Walser Sowers	Newton, N. C.
Nicholas John Storck	North Augusta
Jacqueline Raye Templeton	Charlotte, N. C.
Marc George Tomlinson	Willingboro, N. J.
*Bruce David Vander Wiele	Deerfield Beach, Fla.
James Strom Walker	Wellford
Michael Joseph Walker	Ann Arbor, Mich.
Steven Alan Wells	Sullivan's Island
**Ned Rutledge Workman, Jr.	Plum Branch

BACHELOR OF ARCHITECTURE

Kety Maria Jabbour	Syria, Aleppo

COLLEGE OF COMMERCE AND INDUSTRY

RYAN CUSTER AMACHER, Dean

BACHELOR OF ARTS

Economics

Margaret Helen Behringer	Southhampton, N. Y.
David Martin Franklin	Seminole, Fla.
†*Alexander Smith Fuqua	Nashville, Tenn.
**Kevin Robert Landmesser	Abbeville
Allison Throop McNeill	Atlanta, Ga.
Maxson Kendrick Metcalf	Greenville
Paul Robert Newton	Charleston
*John Leon Schurknight	St. Stephen
William Craig Smarr	Greenville

BACHELOR OF SCIENCE

Accounting

John Nathaniel Anderson, Jr.	Spartanburg
***Charles Michael Ayers	Winnsboro
Donna Denise Bailey	Cross Anchor
Catherine Molly Barrineau	Grafton, Va.
Michael Wynne Boliek	Greenville
Kurt Mandle Bonatz	Farmington Hills, Mich.
Suzanne Carole Bookhart	Oak Ridge, Tenn.
*Beverly Beth Burrell	Clover
*Jessie Rex Butner III	Easley
Jeffrey Stuart Calhoun	Columbus, Ohio
Rita Angela Caro	Bowie, Md.
*Edward Hamer Chandler	Greenville
Paul Stanley Chrusciel	Columbia
Julian Douglas Comer	Hickory Grove
*David John Czabala	Dunwoody, Ga.
*Mary Lori Danese	Jacksonville, Fla.
Jane Elizabeth Dobson	Basking Ridge, N. J.
Karen Lynn Elliott	Spartanburg
Ellen Chi-Chun Fan	Taipei, Taiwan
Amanda Anne Folk	Denmark
*Paul James Foody	Greenville
Jack Arthur Hamilton, Jr.	Edgefield
Carmen Veneita Harris	Gaffney
Cynthia Diane Johnson	West Union
George Logan Kennedy III	Ninety Six
***Tammy Lynn Kudlock	Laurens
*Robin Michele Lawson	Taylors
Catherine Ann Lewis	Clemson
Mark Andrew Litts	New Philadelphia, Ohio
John Russell Madray	Greenville
*Katherine Theresa McAllister	St. Cloud, Minn.
Debra Kay Miles	Ruby
Suzanne Morrison	Richburg
*Anna Catherine Murray	Charleston
Gene Albert Murray	Hampton
*Katherine Marie Murray	Lakeland, Fla.
Ann Mary O'Dea	Greenville
*Reginald Walker Plummer IV	Decatur, Ga.
Kathy Marlene Presley	Greenville
*Patti Renee Presley	Orangeburg
***Karen Helms Price	Greenville
Leslie Ann Runge	Columbia
John Earl Sligh	Central
*Charles Daniel Smith, Jr.	Cohutta, Ga.
*Lynne Ann Snyder	Roswell, Ga.
Edward Floyd Strickland	Timmonsville
Marguerite Ann Thomas	Taylors
Robert Grady Thompson	Clemson
*Elizabeth Anne Burton Vanover	Clemson
Cynthia Ann Walden	Greenville
Michael Ralph Watson	Hanahan
David Allan Willich	Gaithersburg, Md.
*Ann Marie Zeilman	Seneca

Administrative Management

Bradford Lloyd Adamson	Clover
Angela Robertson Albright	Gastonia, N. C.
David Carroll Alexander	Charleston
Tony Glenn Anderson	Ward
William Ronald Armstrong	Prosperity
Sharon Leigh Ayers	Waynesboro, Va.
Kurt Lamar Bagwell	Miami Shores, Fla.
Leigh Andrea Barfield	Hartsville
Julia Garrison Barton	Myrtle Beach
Mona Paige Baxley	Marion
William Jackson Berry IV	Duncan
Jeffrey Pattee Bohnslav	Great Falls, Va.
Laurence Stanislaus Bolchoz, Jr.	Charleston
Laura Anne Brewton	Columbia
Thomas Edward Brown	Orangeburg
Kathryn Elaine Bryant	Columbia
David Robert Burns	Western Springs, Ill.
*Jennifer Jill Bussey	Greenville
Jennifer Lynn Carpenter	Gastonia, N. C.
Deborah Ann Carter	Atlanta, Ga.
Nathaniel Thaddeus Cloer	Pickens
Jeff Michael Cranford	Greenville
Jean Marie Curley	Katonah, N. Y.
Candace Lee Davis	Mitchellville, Md.
Billy Eric Dawson	Anderson
Stephen Clifford Earley	Chester, Ct.
Donald Lamar Easterling, Jr.	Surfside Beach
Janet Elaine Farr	Greenville
Melinda Kaye Fossett	Rock Hill
Jacqueline Cindy Foster	Simpsonville
David John Friedman	Rock Hill
Amy Wyndia Frye	Columbia
Leslie Anne Gatch	Greenville
**Andre Linda Gee	Columbia
Diane Marie Gerrald	Galivants Ferry
Christopher Lynn Goldman	Ninety Six
Teresa Lynne Goodrich	Camden
Cynthia Denise Greene	LaGrange, Ga.
James Robert Hamby	Shelby, N. C.
Loraine Christian Hanckel	Charleston
*Kari Anne Harper	Anderson
*Jennifer Anne Harris	Taylors
*Timothy Jesse Harris	Anderson
William Maxwell Harris III	Luling, La.

Administrative Management (continued)

Linda Mae Hart	Greenville
Karen Ann Hershey	Rochester, N. Y.
Alice Elaine Hines	Orlando, Fla.
***Bruce Furman Hudgens	Seneca
Teresa Rae Hudson	Gaffney
Richie Carroll Huffman	Greenville
*Mark Hopkins Hughes	Cowpens
Dean Christian Infinger	Charleston
Lisa Richardson Jackson	Aiken
Nicki Ann Janis	Franklin Lakes, N. J.
David Lane Jennings	Pickens
David Whitehill Jones	Anderson
Jeffrey Lynn Jones	Heath Springs
Sandra Leigh Jones	Greer
Karl Collins Kemmerlin	Charleston
Stephen Warner Kill	Greenville
Harry Sebastian Linell III	West Palm Beach, Fla.
Michael Donald Lowery	Powdersville
Garrell Wayne Malstrom	Clemson
Anne Mary Martinelli	Madison, Ct.
William Joel Mayers	Marietta, Ga.
Gina Frances McGraw	Spartanburg
Todd Allen Mitchell	Greer
William Brian Moody	Charleston
Monica Ann Moore	Atlanta, Ga.
Pamela Louise Moore	Columbia
Mary Catherine Muth	Goose Creek
Michael Ronald Nations	Easley
David Christian Neill	Charlotte, N. C.
Ronald Wayne Newton, Jr.	Clemson
Karen Pate	York
Jill Michelle Pazur	Parlin, N. J.
Stuart Carter Pinholster	Lexington
Ted Padgett Price	Ridge Spring
Jeffrey Plankenhorn Richards	Greenwood
Larry Franklin Robinson, Jr.	Kershaw
Mary Alice Rose	Columbia
Margaret Eleanor Rowland	St. Mary's, Ga.
Susan Michelle Ruckman	Jacksonville, Fla.
Diane Beverly Sargent	Alexandria, Va.
Stephen Lee Schilling	Atlanta, Ga.
Laura Jean Schwarz	Short Hills, N. J.
Kimberly Sue Scott	Turnersville, N. J.
Jo Ellen Scurry	Chappells
Jody Addison Sease	Salem, Va.
Claudia Lynn Seawright	Edgefield
Wilson Scarborough Sheldon	Roswell, Ga.
Alice Ryan Stribling	Columbia
Rodney Dwayne Turner	Florence
Bonnie Louise Updike	Tega Cay
Katherine Anne Valdes	Mauldin
Ernest Scott Vallentine	Branchville
Randolph Vereen, Jr.	North Myrtle Beach
Jerome Lamar Wade	Graniteville
Cathy Ellen Webber	Greenville
Terri Lynne Weir	Hilton Head Island
Andrea Rose White	Walterboro
James David Williams	Anderson
Jacquetta Elaine Wilson	Charleston
Karen Elizabeth Wilson	Charlotte, N. C.
Lynda Gail Wilson	Myrtle Beach
Cynthia Leigh Wood	Jacksonville, Fla.
James Kurtis Wood	Norcross, Ga.
Carolyn Gail Wright	Atlanta, Ga.
Kathy Ann Yon	Anderson

Economics

Lucia Ann Bell	Columbia
Elizabeth Dawn Boston	Columbia
Joseph Terrell DeFoor	Marietta, Ga.
Gregory Robert Dodson	Greenville
Lisa Garren Floyd	Pendleton
Winfield Scott Harvin	Sumter
William Russell Hurley	Lake Placid, N. Y.
Wesley Teague Jennings	Greenville
James Edward Jeranek	Tega Cay
Charles Rajendran Job	Kuala Lumpur, Malaysia
Gerald McLaw Kaiser	Marietta, Ga.
Anne Margaret Kennedy	Roswell, Ga.
*Laurie Ann Maceyko	Dunwoody, Ga.
Stephen Gerard Main	Pawleys Island
Tracy Ingrid Mincey	Nichols
Ann-Marie Moorhead	Clemson
Suzanne Marie Munroe	Atlanta, Ga.
Laura Joan Murphree	Marietta, Ga.
Michael Kizer Ott	Orangeburg
Anne Louise Palombi	Longwood, Fla.
Amy Susan Patterson	Columbia
Jane Ellen Saporito	Harrison, N. J.
William Scott Simmons	Clinton
*Amy Ellen Sinclair	Spartanburg
Lisa Carol Wilson	Salem, Va.
Martin Wilson Wintermantel	Dunwoody, Ga.

Financial Management

Robert Franklin Adams	Kershaw
Mark Richard Adiletta	Stamford, Ct.
Derwood Lorraine Aydlette III	Charleston
Hiram Mitchell Blasko	Easley
**Edward Louis Bleynat, Jr.	Valdese, N. C.
Judy Gail Bowen	Harrisburg, N. C.
Alicia Marie Bramlette	Greenville
Traci Yvonne Brockman	Greer
Gwen Lorraine Cagle	Rockmart, Ga.
Emily Patrick Calhoun	Charlotte, N. C.
Robert Steven Chester	Statesboro, Ga.
Scott Morrison Coble	Mt. Airy, N. C.
Michael William Colley	Wayne, N. J.
Stephanie Lynn Connell	Atlanta, Ga.
Dianne Lisa Cook	Orlando, Fla.
Connor Lee Coward	Chapin
Matthew McLain Cox	Dunwoody, Ga.
Kelly Lynne Crowe	Carrollton, Ga.
David Bruce Curry	Seminole, Fla.
John Richard Donahue, Jr.	Greenville
Lisa Carole Douglas	Winnsboro
John Allen Ellison	Greenville
Alma Alice Evans	Clemson
Luther Franklin Fant, Jr.	Columbia
Pamela Ann Fodor	Walhalla
Nancy Moore Foster	Honea Path

Financial Management (continued)

Ralph Brian Garrison ---------- Easley
Bryan Richard Grainger ---------- Columbia
Barbara Ellen Green ---------- Naples, Fla.
Angela Joy Hanvey ---------- Clinton
Sherry Lynne Hollinger ---------- Greenville
*Ann Paula Holstein ---------- Batesburg
Robert Louis Horton ---------- Camden
Beth Ann Hudson ---------- Spartanburg
Timothy Austin Jackson ---------- Isle of Palms
Jennifer Nan Jamieson ---------- Macon, Ga.
James Guy Kennedy ---------- Batesburg
Bryan James Kirby ---------- Greenville
Geoffrey Tyler Korwan ---------- Hilton Head Island
Dorothy Michelle LaMarche ---------- Raleigh, N. C.
Leslie Kinard LaRoche ---------- John's Island
Athena Joanne Leventis ---------- Cayce
Karen Renee Livingston ---------- Prosperity
Ann Manning Magoffin ---------- Columbia
Edward Ray Martin ---------- Honea Path
Kathryn Allison Molony ---------- Mt. Pleasant
Bradley Brown Morgan ---------- Seneca
Lisa Joy Murphree ---------- Seneca
Kimberly Renee O'Dell ---------- Union
Teresa Kay Parker ---------- Chattanooga, Tenn.
Tina Rena Perry ---------- Greer
Caryl Lynne Plasket ---------- Columbia
Thomas Frederick Platt ---------- Anderson
Karen Lynn Poston ---------- Greenville
Elzo Elton Potts ---------- Walhalla
Susan Hampton Richardson ---------- Columbia
Mark Anthony Rozakos ---------- Fountain Inn
Roy Arthur Seaver, Jr. ---------- Greenville
Phillip Raymond Sill II ---------- Spartanburg
Isaac Sheppard Sullivan, Jr. ---------- Kershaw
Jill Sutherland ---------- Jacksonville, Fla.
James Ralph Talton III ---------- Greenville
Mary Katherine Tolbert ---------- Marietta, Ga.
*Nancy Jo Tucker ---------- Columbia
Mark Stephen Vaughan ---------- Pelzer
*David Bullard Whelpley, Jr. ---------- Atlanta, Ga.
Gary Randall Williams ---------- Greenville
Joyce Clair Williams ---------- Greenwood
William Jaques Wolff, Jr. ---------- Wilmington, N. C.
Carolyn Lynn Woodfin ---------- Inman
*Michael Scott Zehfuss ---------- Atlanta, Ga.
Jacqueline Leslie Zemp ---------- Camden

Industrial Management

Karl Bradley Barron ---------- Gaithersburg, Md.
Mark Reeves Bell ---------- Gainesville, Ga.
***David Andrew Benjock ---------- Rock Hill
Constance Carol Brown ---------- Skaneateles, N. Y.
*Mary Melissa Bullington ---------- Spartanburg
Mark Allen Cavendish ---------- Spartanburg
Michael Eugene DeLafosse ---------- Tucker, Ga.
Frank Bolton Fredere III ---------- Winston-Salem, N. C.
Cathy Jo Griffin ---------- Simpsonville
Steven Wayne Hudson ---------- Danville, Va.
David Clyde Jackson ---------- Abbeville
Russell Luke Kingon ---------- Atlanta, Ga.
*Marc Roth Leclair ---------- Silver Spring, Md.
Jerry Lee Middleton, Jr. ---------- McClellanville
William Edward Mostellar ---------- Atlanta, Ga.
Brenda Sue Nitschke ---------- Kingsport, Tenn.
Ron Cameron Owen ---------- Decatur, Ga.
Charles Mark Owens ---------- Greenville
Hugh Oliver Pearson III ---------- Beaufort
John Scott Pigeon ---------- Fort Washington, Md.
Roy Dale Swing, Jr. ---------- Lexington, N. C.
William Carl Thomas III ---------- Greenville
Andrea Ellen Young ---------- Arden, N. C.

Textile Chemistry

Earl Wilton Allison, Jr. ---------- Piedmont
Michael Duval Cannon ---------- Spartanburg
Eric Steven Dominick ---------- Salisbury, N. C.
Susan Elizabeth Eller ---------- Easley
**Yvan Joseph Germain ---------- Repentigny, Quebec, Canada
Jack Cullum Scott, Jr. ---------- Greenwood
Adriene Marie Smith ---------- Spartanburg
Christine Elaine Wood ---------- Gray Court

Textile Management

Janice Yvonne McCray ---------- Spartanburg
John Broaddus Rutledge ---------- Clemson

Textile Science

**Andrew Keith Green ---------- Spartanburg
*Tate Haymond ---------- Clemson
*Jurgen Ziegler ---------- Spartanburg

BACHELOR OF TEXTILE TECHNOLOGY

John Turner Davis ---------- Danville, Va.
***Jacqueline Liggett Grossman ---------- Clemson
Denise Hannah ---------- Dalton, Ga.
Joseph Henry McCain ---------- Lancaster
Dan Britt Thompson ---------- Raleigh, N. C.

COLLEGE OF EDUCATION

JAMES EDWARD MATTHEWS, Dean

BACHELOR OF ARTS

Early Childhood Education

Catherine Ruth Burton	Greenville
*Alicia-Leigh Leslie Cox	Clinton
Ronda Fay Eargle	Columbia
Nancy Lynn Ferrell	Spartanburg
Diana Lynn Forgett	Woodcliff Lake, N. J.
Sonya Donnette Lanford	Woodruff
Tammy Darlene McElrath	Spartanburg
*Sara Louise Moore	Rock Hill
Cari Elizabeth Moser	Gastonia, N. C.
*Kathryn Lynn Olson	Rock Hill
Sara Ellen Owens	Greer
Louise Sadler Pinckney	Columbia
*Suzanne Rene Raybon	Columbia
Julie Edwards West	Greenville
*Barbara Bishop White	Clemson

Elementary Education

Monica Jolene Algood	Irmo
**Kara Louise Atkins	Greer
Catherine Kimberly Bailey	Columbia
*Roseanne Marie Barone	Marietta, Ga.
Linda Marie Basso	Easley
*Jo Ann Blair	North Augusta
Melissa Nadean Brooks	Seneca
Karin Helene Bruhjell	Greenwood
Kelly Frances Carr	Orlando, Fla.
*Jill Ann Curtin	Summerville
*Sherry Annette Deik	Barnwell
**Doris Elizabeth Downs	Mt. Pleasant
Kelli Lynn Erickson	Central
*Elizabeth Prior Eskridge	Anderson
Alisa Ann Ferguson	Mt. Pleasant
Ruba Rebecca Gramling	Gramling
Mary Jane Green	Rock Hill
***Cynthia Faith Gwinn	Pickens
Cynthia LeeAnn Haralson	Summerville
Laura Elaine Henderson	Greenville
*Martha Llewellyn Hines	Florence
Kimberly Elizabeth Hucks	Greenville
Katherine Naomi Jones	Greenville
Lisa Marie Keaton	Abbeville
*Elizabeth Anne King	Rock Hill
**Lynn Michelle King	New Concord, Ohio
Andrea Suzanne Lee	Roebuck
Laura Newman Lewis	Clemson
Pamela Sue Lobb	Columbia
Kathryn Elaine Magoulas	Charleston
Sarah Syron Morton	Miami, Fla.
Gwendolyn Gay Murphy	Greenville
Laurie Anne Newcomb	Charlotte, N. C.
Debra Murphy Peebles	Sandy Springs
Roberta Jo Pinchiaroli	Cape Coral, Fla.
Janet Marie Powell	Anderson
Sallie Caroline Rankin	Belton
Julia Elizabeth Reeves	Simpsonville
Sarah Bowery Rockwell	Bethune
Suzanne Smith	Laurens
Holley Genell Stafford	Spartanburg
Kimberly Kinard Stuck	Pomaria
Wendy Davis Titus	Rochester, N. Y.
Pamela DeAnne Wallenzine	Greer
Kimberly Ann Watson	Anderson
Christiana Whitmire	Hendersonville, N. C.
**Jeffrey Reid Wilson	Anderson

Secondary Education

Ann-Marie Armstrong	Abbeville
Randall McLane Balch	Clemson
Karen Elaine Edwards	Seneca
Scottie LaRay Enzor	Green Sea
John Mark Farris	York
Virginia Wayne Gaines	Greenville
Dawn Michelle Gray	Greenville
Jamie DeAnne Gregory	Rock Hill
Gemma Lucille Johnson	Spartanburg
Mitzi Michelle Jones	Greenville
Cindy Lynn King	Simpsonville
Tracy Renae Langston	Norris
Julie Ann Maney	Summerville
*Angela Marie Muller	Seneca
Margaret Elizabeth Murphy	St. Petersburg, Fla.
Nancy Carol Pool	Gainesville, Ga.
*Bradley Davis Rothell	Piedmont
Paula Lynn Ryan	Paris, Tenn.
Terri Whitten Smith	Six Mile
*Beverly Kay Truesdale	Kershaw
Beverly Ann Wade	Pickens
Susan Blodgett Whiten	Walhalla

BACHELOR OF SCIENCE

Graphic Communications

Wendy Lowe Agee	Basking Ridge, N. J.
James David Boehm	Summerville
James Campbell Chapman	Huntington, N. Y.
Lisa Kay Culver	Salisbury, Md.
Cheryl Dawn Evans	Linthicum, Md.
**Lori Elizabeth Harper	Greenville
Malcolm McKinlay McIsaac, Jr.	Kershaw
Beth Anne Zimmerman	Simpsonville

Industrial Education

Rhonda Hall Cartee	Greenville
**Floyd Edward Estelle	Greenville
Reid Phillip Ingle	Clemson
Stephen Earl Martin	Union
David Brooks Smith	North Augusta

Science Teaching

Sandra Kay Bell	Oak Ridge, Tenn.
Barbara Danielle Dansby	North Augusta
Cynthia Lynn Fletcher	North Augusta
Michael Curtis Giordano	Sharon, Pa.
Susan Hope Hall	Laurens
*Tracy Lynn Hieber	Roswell, Ga.
Amy Beth Onofrio	Vienna, Va.
*Claude Raymond Workman	Charlotte, N. C.

COLLEGE OF ENGINEERING

JOSEPH CHARLES JENNETT, Dean

BACHELOR OF SCIENCE

Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

John E. Arnold	Darlington
Lowell Keith Carter	Loris
David Earle Christopher	Anderson
Scott Fredrick LaFave	Summerville
Franklin Ott McAlhany, Jr.	Branchville
Frank Edward McLeod, Jr.	Newberry
William Jeffrey Mitchell	Christiansburg, Va.
James Irvin Mixson	Orangeburg

Ceramic Engineering

Thuane Mahnay Brockington	Charleston
*David Andrew Clark	Simpsonville
William Allen DuBose, Jr.	Sumter
*Donna Jo Owens	Sumter
Joseph Julian Railey	West Columbia
Robert Clark Schikner	Dayton, Ohio

Chemical Engineering

David Patrick Adcock	Mauldin
Ruth Anne Albright	Black Mountain, N. C.
Michael William Apperson	Greenwood
Caroline Frances Arisman	Walhalla
Susan Guinn Bailey	Aiken
Ernest Brevard Bass	Charleston
David Scott Bell	Charlotte, N. C.
**Amy Elizabeth Bohr	Sylvania, Ga.
Kevin Powers Bunting	Sunset Beach, Hawaii
Gregory Thomas Chandler	Aiken
Richard Allen Coats	Greenwood
†**Steven William Cochran	Arden, N. C.
***Michael Lee Connelly	Greer
†***Deborah Ann Edwards	Greenville
*Jennifer Alane Gardner	Rock Hill
Linda Marie Hartle	Spartanburg
Edward Montgomery Heins, Jr.	Kingstree
**Eric Bryan Hills	Columbia
Timmy Edward Hysinger	Greenville
Sanjeev Kumar Jindal	Aiken
Ian Robert MacDonald	Simpsonville
Walter Stephen Marbert	Aiken
Kirt Lyvell Matthews	Timmonsville
Douglas Paul Moore	Belton
Daniel Wade Mullin	Mt. Pleasant
Ross Timothy Murphy	Chelsea, Mich.
Michael Ray Norton	Aiken
Anne Marie Papineau	Wilmington, Del.
Graham Richard Piper	Simpsonville
Robert Allen Pittman	Florence
Gary Edward Quinton	Miami, Fla.
*Ralph Scott Radford	Anderson
Terri Rawlings	Greenwood
Cathy Ann Ridgeway	Belton
*Arthur Elliott Robertson, Jr.	Heath Springs
David Robert Slagel	Savannah, Ga.
Stacey Claire Smith	McKeesport, Pa.
*Mark Alexander Todd	Walhalla
Scottie Wayne Turner	Pickens
Chellis Elaine Watt	Seneca
Jon Robert Wise	Wooster, Ohio
Daniel Lloyd Wright	Mauldin

Civil Engineering

Dallas Daniel Ball	Clemson
Nina Katrina Bowman	Melbourne, Fla.
William Henry Branham III	Columbia
William Gregory Brunson	Savannah, Ga.
Nathan Robert Cecil	Spartanburg
Keith Edwin Dacus	Clemson
***John Kern Earle IV	Greenville
*Reed Bruce Freeman	Weston, Ct.
Scott Allan Glass	Charleston
Cheryl Ira Goodling	Tallahassee, Fla.
Daniel Mark Harvey	Greer
Ron Eric Haynes	Concord, N. C.
Debra Lee Hernandez	Summerville
Robert Scott Keller	Gaffney
*Douglas Brian Kinard	Pomaria
*Kenneth Bradley Leland	Georgetown
Shahram Malek	Atlanta, Ga.
David Wesley Martin	Jupiter, Fla.
*Marcus Lee Miller	Roebuck
Logan Abraham Moore, Jr.	Franklin, N. C.
Jorge Agustin Morrell	Lakeland, Fla.
Kelvin Lane Morris (Degree awarded posthumously)	Rossville, Ga.
David William Moughton	Youngstown, N. Y.
*Ronald Keith Peterson	Greenville
William Gerald Phipps, Jr.	West Columbia
James Albion Porth	St. Matthews
Francis Raymond Price III	Charleston
Lawrence Marion Ragsdale, Jr.	Greenville
*Zaher Akram Rassassi	Beirut, Lebanon

Civil Engineering (continued)

Matthew Gilbert Rennhack	Camden
*David Linwood Schultz	Fort Myers, Fla.
Steven Wesley Sherrill	Randallstown, Md.
Alexander Feico Gerard Sipkes	San Diego, Cal.
Daniel Thomas Steele	Greenville
Anthony Michael Sweatt	Bennettsville
William Thomas Taylor	Anderson
Christopher Frederick Thomas	Newark, Ohio
Dennis Michael Thomas	Clemson
Jonathan Dodd Townsend	Lake View
Michael Larry Van Der Heyden	Clemson
Stephen Donald Vitale	Silver Spring, Md.
***David Lewis Weaver	Morgantown, W. Va.
Wynn Elizabeth Wood	Fairfax, Va.

Computer Engineering

*Michael Nickles Allen	Greenville
Keith Edmund Appleby	Estill
Jeanne Cook Ball	Clemson
†**Jon Dickens Barry	Florence
Robert Pryor Beliles, Jr.	Oakton, Va.
Jeffery Paul Boatman	Spartanburg
Ronald James Bottomly	Stafford, Ct.
Jodi Leann Bowser	North Augusta
Sandra Kay Brown	Mauldin
Robert Francis Bryant	Lake View
Timothy Doyle Caldwell	Goose Creek
Dorsey Suzanne Chavis	Bennettsville
Paul Andre Cote	Ladson
Robert Douglas Dixon, Jr.	Brevard, N. C.
James Clegg Frost	Hendersonville, N. C.
Richard Lee Harley	Trenton
Melanie S. Jarvis	Lincolnton, N. C.
Clarence Christopher Jenkins	Rock Hill
Jo Anne Joyner	Wilson, N. C.
Mark Eugene Lentz	Franklin, Tenn.
Jennifer Mitchell	Clover
*Donald Mark Moore	Simpsonville
Robert Wayne Moser, Jr.	Chester
Beverly Denese Nix	Liberty
†**Mohnish Pabrai	New Delhi, India
*Mary Antoinette Priebe	Clermont, Fla.
William Blair Rawls	Greenville
**Charles Edwin Riehm III	Indialantic, Fla.
†**Scott Dion Rodgers	West Columbia
James Allan Shoemaker II	Sumter
Todd Merrill Snider	New Paltz, N. Y.
†**Mary Joyce Towles	Charleston
Robert Swope Wade	Aiken
*Eric Hayes Walker	Columbia
***Nelson Wayne Willhite	Myrtle Beach
Robert Nelson Williams	North Augusta
*Clarence Russell Willis	Johnsonville
Henry James Willis	Simpsonville

Electrical Engineering

Jeffrey Stuart Arnold	Asheville, N. C.
*Bruce Garrett Bacon	Columbia
Melisa Anne Bagley	Columbia
Donald Kerry Barnette	Blue Ridge
William Keith Barrett	Salem
Elizabeth Anne Bennett	Clemson
Albert Carlo Bianco, Jr.	Columbia
**Bromley Keith Birchfield	Columbia
Michael Troy Branning	Batesburg
*Alf Brooks III	Fountain Inn
David Cureton Campbell, Jr.	Pelzer
*Helen Haynsworth Carroll	Gaffney
**Roger Scott Carver	Kingsport, Tenn.
Robert Lee Catron, Jr.	Daytona Beach, Fla.
*Michael Stirling Cosson	Oak Ridge, Tenn.
*John Vincent DelVecchio	Seminole, Fla.
**Judy Ann Drews	Decatur, Ga.
William Howard Fowler	Walhalla
*Kenneth Lamar Galloway	Wellford
Michael Joseph Grogan	Rochester, Mich.
**Mark Douglas Hall	Myrtle Beach
†**Don Russell Harris	Summerville
John Simon Henry	Charleston Heights
Andrew Friedrich Hermann	Waldorf, Md.
Joseph Alexander Heustess	Kershaw
Joy Denise Hodges	Rock Hill
George Kingman Hodgkiss III	Mt. Pleasant
*Jerry Lea Ivey	Cowpens
Thomas Milton Jameson III	Easley
Clifford Wayne Kirkland, Jr.	Aiken
†***Jayesh Kotecha	Spartanburg
Donald Peter Kredensor	Fallston, Md.
Charles Windell LaHay, Jr.	Clinton
Steven Ray Lancaster	Woodruff
Joel Dean Ledbetter	Spartanburg
Vicky Rene Livingston	Swansea
Scott Saunders MacLean	Bridgton, Maine
Robert Scott Manning	Simpsonville
Patrick Gregory Marsh	Newberry
Jeffrey Michael Mather	Fallston, Md.
DeeAnn Jennifer McKenny	Lawrenceville, Ga.
**Mary Ethelyn McNeely	Monroe, N. C.
†**Todd Wayne Nichols	Saluda
Alan Blair O'Heron	Hanahan
Thomas Evans Page, Jr.	Mt. Pleasant
***Sheila Ann Paskel	Aiken
David Hart Paul	Seneca
Mark Charles Perreault	Columbia
*William Eugene Polk, Jr.	Rock Hill
Mark Robert Powell	Greenville
Vernon Thomas Powell	Charleston
James Robert Rainear	Hanahan
Allen Brookie Richardson	Tyrone, Ga.
Duane Scott Roulier	Little Torch Key, Fla.
Jack Davis Sexton III	Laurens
*Gregory Mark Stephens	Aiken
Alan Dale Sullivan	Snellville, Ga.
William Wright Bryan Sullivan	Central
Michael Edward Terry	Greenwood
James Brian Vassey	Anderson
William Hale Vickery, Jr.	Simpsonville
Kimberly JoAnn Vinson	Winston-Salem, N. C.
*Vicki Jean Wampler	Kingsport, Tenn.
Paul Andrew Ward	Davenport, Iowa
†*Robert Mitchell Ward	Florence
Joseph Maybank Weed	Charleston
Keith Alan Wieckowski	Hamilton Square, N. J.
Lawrence Amin Williams	Campobello
*Peter Harmon Williams	Goose Creek

Engineering Analysis

*Virginia Bryan Brown	Cleveland
Robert Alan Bullock	Hockessin, Del.
James Lincoln Neighbors	Wexford, Pa.

Engineering Technology

Joel Franklin Alexander	Seneca
Steven Freeman Barbour	Mauldin
Barry Lee Blassingame	Seneca
John Herschel Bragg	Simpsonville
Warren Arnold Bright	Seneca
Michael Francis Cantey	Mount Pleasant
Michael Carey Crawford	Columbia
Thomas Benton Drummond	Aiken
William Bradley Hinchman	Greenville
*Toye Flowers Howle	Darlington
Roderick Timothy Huntley	Darlington
Thomas Martin Jacky	Anderson
Leon Pete Kythas	Greenville
Marvin Timothy Long	Westminster
Stephen Pinckney Mason	St. George
Edward Francis McDevitt	Clemson
Robert Smith McKinnell	Greer
McFarland Heard Mikell III	Charleston
James Edward Morrah, Jr.	Greensboro, N. C.
Kyle Edward Nelson	Columbia
Alan Dean O'Bryan	Clemson
Robert Jeffrey Parker	Gordo, Ala.
Rex Clayton Perdue	Martinsville, Va.
Sammy Pickens Phillips, Jr.	Pendleton
John Carl Regan, Jr.	Manning
Connie Frances Rollinson	Abbeville
Michael Christopher Savinda	Mt. Pleasant
Stefan Carl Seidl	Greer
Mark Lindsay Smith	Anderson
James Edward Snipes, Jr.	Charleston
Johnny Paxton Southern	Belton
Timothy Franklin Steedly	Bamberg
*Julia Ann Tissue	Newark, Del.
Michael Glenn Walpole	Columbia
Tony Rene Wood	Columbia

Industrial Engineering

Caroline Tommey Boatwright	Covington, Va.
Gail Ann Holland	Brevard, N. C.
Tonetta Elizabeth Robinson	Kansas City, Kan.
James Hiers Vernon, Jr.	Darlington

Mechanical Engineering

Bernie Dwight Abel	Kemblesville, Pa.
Harold Christopher Adkison	Bath
†**John Payton Beans	Florence
Joseph Scott Betoski	Lexington
Robert Neely Blackmon	Charlotte, N. C.
David Edward Bullard	Lake Park, Fla.
*David Fred Bullock	Clemson
*Melissa Jean Burnett	Inman
Robert Lewis Catoe	Lancaster
Thomas Sidney Cavallaro	Annapolis, Md.
Eduardo Javier Coca	Cochabamba, Bolivia
James Robert Cothran	Walhalla
William Brian Darling	Johnson City, Tenn.
†**John McPherron Davis	Chesterfield
Sherri Anita Dixon	Greenville
Susan Ione Donnelly	Oak Ridge, Tenn.
*Daniel Alfred Dorroh	Silverstreet
Amy Ann Freeman	Gainesville, Ga.
*Michael Francis Gosnell	Asheville, N. C.
Diane Marie Graham	Cheraw
Keith Allen Grant	Greenville
Paula Dianne Greene	Gaffney
Carol Evelyn Grobe	Asheville, N. C.
Clarence Luther Guthrie III	Greer
Cary Bryan Hall	Brevard, N. C.
John Christopher Hallford	Toccoa, Ga.
Jimmy Cleon Haywood, Jr.	Warrenville
Ralph Kevin Huneycutt	Charleston
Steve Calhoun Hunt	Seneca
Gerald Carlyle Jackson, Jr.	Hanahan
Patrick Wade James	Bluefield, W. Va.
David Andrew Jansen	Charleston
*Raymond Edgebert Jones	Spartanburg
Daniel Frederick Kassis	Charleston
Kenneth Carroll Kennedy II	Chapel Hill, N. C.
Kenneth Edward Lagroon	Anderson
Guy Deon Lewis III	Greenville
Robert William Lofink, Jr.	Greer
Ralph Griffin Macdonald, Jr.	Sumter
†*Jo Lin Malsam	Woodruff
Anthony Lee Mathis	Atlanta, Ga.
**Andrew Ervin McLeod	Florence
Daniel Ray McMinn	Clemson
Brian Dudley Merriman	Florence
Barry Cooper Mitchell	Spartanburg
**Albert Bailey Newton	Charleston
Gregory J. Nield	Midland, N. C.
David Lander O'Nan	Hopkins
Michelle Bailey Peralta	Summerville
Graham Wade Rinehart	Georgetown
David Mack Rogers	Marion
Michael Allen Rogers	Greenville
John David Ruehle	Elyria, Ohio
Stephen Douglas Ruel	Enfield, Ct.
***Thomas Andrew Salmon	Spartanburg
Anthony Michael Salvatore	Travelers Rest
Kyle Dewey Scaggs	North Augusta
Henry Diedrich Schweers III	Mt. Pleasant
Frank Kenneth Sharp	Columbia
Christopher Everett Sipe	Aiken
Terry Richard Sloan, Jr.	Aiken
Michael Robert Sorokach, Jr.	Georgetown
Matthew Patrick Sturr	Groton, Mass.
Thomas Neel Taber	Wrightsville Beach, N. C.
Robert Lee Turner, Jr.	Myrtle Beach
**Scott Chalmers Wallace	Mauldin
Kurt O. Wassen, Jr.	Summerville
Caroline Corryne Webb	Charlotte, N. C.
Brian Hampton West	Spartanburg
*Christopher Robert Wiley	Silver Spring, Md.
Gregory Allen Wilkerson	Mauldin
Larry Eugene Williams, Jr.	Greenville
David Andrew Wilson	Summerville
Jeffrey Miner Wilson	Charleston

COLLEGE OF FOREST AND RECREATION RESOURCES

BENTON HOLCOMB BOX, Dean

BACHELOR OF SCIENCE

Forest Management

Blair Frazier Baldwin	Chapin
Robert Lawson Brown	Greenville
Tracy Alan Burttram	North Augusta
Andrew Charles Eiler, Jr.	Norfolk, Va.
*Russell Paul Hubright	Laurens
Timothy Lamar Jones	Anderson
Michael Grey Schleimer	Anderson
Dale Wayne Stoudemire	Chapin

Parks, Recreation, and Tourism Management

Allan Bruce Bomar	Central
Rainaud Fernando Brown	Rome, Ga.
Vivien Case	Rockville, Md.
Carol Bowles Coleman	Greenwood
James Robert Corley	Greenwood
Steve Allen Durham	Greer
Callie Mae Emery	Germantown, Tenn.
Kelly Sue Evans	Anderson
Elizabeth Hobert Lamar Fabian	Charleston
Lori Linda Fogle	Cordova
Karen Lee Freed	Marietta, Ga.
Kippanie Faye Gordon	Lexington
Erin Kendra Graves	Kershaw
Kelly Rene Haulbrook	Greenville
Wendy Leigh Jackson	Clinton
Katherine Etheridge Kenney	Raleigh, N. C.
Mark Adair Madden	Clinton
Thurmon Luke Ashley McLamb	Little River
Richard Farrell Noyes	Anderson
Kathleen Lois O'Brien	Norwalk, Ct.
Rita Carol Petty	Marietta, Ga.
Carol Marie Ratchford	Aiken
Reuben Mills Rogers, Jr.	Lake View
Lisa Karen Schaumann	Wilmington, Del.
*Judy Ann Vander Horst	Celina, Ohio
*Dayton Stanton Whites	Lucedale, Miss.

COLLEGE OF LIBERAL ARTS

ROBERT ALFRED WALLER, Dean

BACHELOR OF ARTS

English

*Joanna Lee Acorn	Pendleton
Charles Dantzler Albergotti III	Florence
*Evodney Floris Bacchus	St. Vincent, West Indies
Connie Suzanne Bolding	Six Mile
Maria Lucille Brock	Dover, N. J.
Harold Graham Creech	Charleston
Karen Lynn Cross	Landis, N. C.
Wallace Parrott DesChamps, Jr.	Wisacky
Leslie Christine Diggs	Florence
Melinda Lou Dodson	Greenville
Todd Edward Dowell	Kinnelon, N. J.
Kimberlie Patterson Edmunds	Charleston
Joy Cecilia Hall	Greenville
**Cynthia Annette Hipp	Greenville
Laura Michele Hope	Jacksonville, Fla.
*Lisa Ann Knight	Florence, Ala.
*Margaret Wood Laird	Paris, Tenn.
Charles Ray Lawrence, Jr.	Simpsonville
Julia Laurens McAlpine	Bennettsville
Lisa Caroline McClain	Walhalla
Melissa Crayton McCown	Darlington
Heather Lynn McGirt	Columbia
*Melanie Marie McKie	North Augusta
Deborah Ruth Munroe	Sumter
Spiros George Papleacos	Key West, Fla.
Lavinia Rogers	Greenville
Pamela Teresa Sheppard	Easley
Angela Yvonne Solomon	Sumter
Susan Fripp Still	Spartanburg
Janet Lynn Stroble	Greenville
Troy Miles Terry	Hardeeville
*Joseph Lee Tinsley	Easley
Carolyne Lisa Wallace	Mt. Pleasant
Valerie Anne Whitley	Alexandria, Va.
Janice Carol Wilson	Abbeville
Sharon Lee Younis	Hilton Head Island

History

Sharon Kay Brandenburg	Elloree
Rodney Odette Johnson	Darlington
Scott Dunlap Kerr	Simpsonville
Frederick George Kleisch	Pickens
***Thomas Francis Roby	Clemson
Michael Dewey Sutton	Greenville
Steven Warren White	Greenville

Modern Languages

Mary Margaret Harrison	Greenville
Elizabeth Ann Mirick	Summerville
Mary Evelyn Owens	Greer
Stephanie Glynn Steckler	New Orleans, La.
Antoinette Racine Tolbert	Charleston
Chantal Marie Wittman	Hendersonville, N. C.
Lora Leigh Wright	Marietta, Ga.

Political Science

Judith Anne Ahlfeld	Aiken
Kimberly Ann Bates	Central
Timothy Culler Bennett	Charleston
Scott David Bridgeman	Easley
Lisa Deanne Cooke	Greenville
Eleanor Donna Dreher	Columbia
Jacqueline Fay Fogle	Cope
Graham Miller Frye	Pendleton
**Gary Alan Jones	Clemson
William Mattison Locke	Honea Path
Susan Darlene Looper	Easley
Keith Brian Marcus	Richmond, Va.
John Peter Marks	West Long Branch, N. J.
Janet Caroline Moja	Titusville, Fla.
William Michael Moore	Charleston, W. Va.
Eric Tyler Olsen	Cocoa, Fla.
Christoffer Dean Oxford	Seneca
Northam Dudley Parr, Jr.	Greer
Patrick Joseph Rooney	Palm Beach Gardens, Fla.
Timothy Wayne Scott	Easley
**William Brian Shearer	Marysville, Ohio
*Julia LaClaire Shuler	Santee
Cheri Yvette Sigmon	York
Michael Joseph Simmons	Florence
Larry Anthony Welborn	Greenville
George Bruce Woods III	Charlotte, N. C.

Psychology

Laura Michelle Allen	Columbia
***Vanessa Kaye Ammen	Spartanburg
Glenna Sheryl Anderson	Moore
Kimberly Janice Bagwell	Ware Shoals
Cynthia Caroline Beresh	Piedmont
*Deanna Marie Omasta Braddy	Jacksonville, Fla.
Melinda Ellen Browne	Miami, Fla.
Helen Elizabeth Eaddy	Columbia
*Anne Renee Gagnon	Adelphi, Md.
Marybeth Galani	Lewiston, N. Y.
Amye Shannon Hodges	Greenwood
Kelley Diane Kastory	Winter Park, Fla.
Lori Danene Mahanes	Charlottesville, Va.
Rhonda Dee McConnell	Clayton, Ga.
Teresa Annette Moody	Spartanburg
Amanda Margaret Morris	Columbia
Jennifer Lynn Parker	Edgefield
Christopher Honan Schoen	Williamstown, Mass.
Robin Lynn Scoggins	Simpsonville
Larry Keith Todd	Lancaster
Rebecca Owens Tuten	Mt. Pleasant
**Tara Leigh Weathers	Bowman
Laura Lynn Wilson	Charleston

Sociology

Guy Dent Adams, Jr.	Kingstree
Deanne Elaine Browning	Ft. Pierce, Fla.
Brian Lee Butcher	Atlanta, Ga.
Lori Ann Copelan	Beaufort
Sharon Louise Dengel	Upper Saddle River, N. J.
Mark Spires Durham	Greenville
Ashley Carlisle Ledford	North Augusta
Laura Mabry	York
Brent Duane McGee	Warrenville
Angela Maria Norungolo	Greenville
Kelly Melissa Peay	Rock Hill
Rashidi Ann Reinovsky	Pickens
Barbara Phillips Roe	Six Mile
Michael John Scheible	Chapin
James Estel Scott	Alexandria, Va.
*Karen Elizabeth Shepherd	Greenville
Lori Jean Stephens	Seneca
Colleen Ellen Thomas	St. George
Georgia Anne Thomas	St. George

Double Major

Economics and French

Julia Rives Sellers	Columbia

English and Mathematical Sciences

David Michael Bender	Charlotte, N. C.

Political Science and Spanish

*Jill Annette Barker	Kingsport, Tenn.
***Mae Frances Mizell	Doraville, Ga.

COLLEGE OF NURSING

MARY MARGARET LOHR, Dean

BACHELOR OF SCIENCE

Nursing

Cynthia Renee Adams	Hanahan
Jane Elizabeth Alexander	Charlotte, N. C.
Tammy Michelle Allen	Anderson
Elizabeth Hite Alvey	Belleville, Illinois
Elizabeth Jane Anthony	Charlotte, N. C.
*Ann Marie Banks	Gaithersburg, Md.
Holly Anne Barfield	Kershaw
Tammy Lynwood Barnes	Summerton
Wade Martin Brodie, Jr.	Aiken
Mary Katherine Brown	Woodruff
*Wendy Michelle Buckner	Burlington, N. C.
Susan Lynn Burkhart	Greenville
Janet Lee Butler	Gaffney
Kelly Ann Cahill	Jacksonville, Fla.
Dennise Marie Cannon	Mauldin
Edna Elizabeth Carmichael	Mullins
*Rebecca Reid Clark	Johnston
Karen Lynn Conwell	Greer
Susan Gail Cooper	Columbia
Michael Howard Craig	Otto, N. C.
Susan Castle Crouch	Mt. Pleasant
Mary Lee Davis	Inman
Deborah Kay DeVine	Sumter
Lisa Rene Dickard	Anderson
Jennifer Lynne Duncan	John's Island
Roberta Crockett Evans	Bluefield, W. Va.
Mary Sue Fellers	Newberry
Heather Clarke Field	Orlando, Fla.
Karin Lynne Foster	Newtown, Pa.
Nancy Thomas Fowler	Pendleton
Angela Danette Franklin	Columbia
Mary Ann Funderburk	Neeses
Sylvia B. Gann	Thornton, Pa.
Cynthia Anne Gilbert	Leesburg, Fla.
***Lydia Elaine Gillespie	Simpsonville
Sherie Leigh Griffin	Allendale
Shannon Hallowell	Orlando, Fla.
*Kathy Lee Hammock	Kingsport, Tenn.
Cheryl Lynn Hamre	Greenville
Torri Kimberly Harvey	Hampton
Ellen Elizabeth Hatfield	Fort Lauderdale, Fla.
Debra Sue Hinnant	Winnsboro
Leslie Sue Hinson	Lancaster
**Martha Craig Holcomb	North Augusta
Pamela Lynne Holyoak	Roswell, Ga.
Angela Dawn Hood	Clemson
Robin Lynn Huddleston	Greenville
Nore Hutchings Hunter	Clemson
Carla Renee James	Seneca
Shirley Rae Jordan	Pageland
*Lisa Marie Kyle	Spartanburg
Marian Lynne Looper	Seneca
Dawn Carole Lorenz	Lawrenceville, Ga.
*Linda Marie McCoy	Walhalla
Janice Lynne McElwee	Richmond, Va.
Crystal Dawne McGee	Brevard, N. C.
Ann Margaret McNally	Birmingham, Ala.
Kimberly Ann Meredith	Summerville
Nancy Weinberg Moody	Darlington
Rebecca Leigh Moore	Anderson
Paula Marie Oelberg	Columbia
*Rebecca Lynn Owings	North Augusta
Ann Christine Pikus	Prosperity
Julie Ann Plaisance	Asheville, N. C.
Susanne Elizabeth Plowden	Manning
Karen Marie Polk	Hampton
Patsy Marie Rozier	Hardeeville
Anne Moser Rucker	Greenville
Robin Renee Sawyer	Dillon
Stephanie Kay Schauer	Greenville
Susan Lynn Scobee	Roswell, Ga.
Dale Rene Scurry	Chappells
Julia Stickley Shover	Staunton, Va.
*Herbert Stephen Smith	Portsmouth, Ohio
Tamara Lynn Stevenson	Temple Hills, Md.
Theresa Lynn Stokes	Charleston
Shelley Demaris Strickland	Spartanburg
Mark Eugene Stroud	Marietta
Jana Dannette Styles	Easley
Karen Anne Sutphen	Princeton Junction, N. J.
Sandra Kaye Tillotson	Spartanburg
Lorie Anne Trapasso	Toccoa, Ga.
Mildred Hugh Trowell	Varnville
Rebecca Shaw Walpole	Columbia
Annie Elizabeth Walton	Anniston, Ala.
Beth Anne Welham	Scottsdale, Ariz.
Kimberly Alison West	Bel Air, Md.
Carla R. Stratton Wham	Fountain Inn
Gena Darlene Williams	Florence
Leigh Ellen Wingard	Lexington

COLLEGE OF SCIENCES

HENRY ELLIOTT VOGEL, Dean

BACHELOR OF ARTS

Chemistry

*Steven Michael Amerson	Atlanta, Ga.
*Lisa Marie Schwartz	Clemson

Geology

Mark Stanley Teskey	Charlotte, N. C.
*Joseph Lee Tinsley	Easley

Mathematical Sciences

Angela Marie Brown	Columbia
Elizabeth Rebecca Miller	Spartanburg

Zoology

Barbara Alice Vogel	Clemson

BACHELOR OF SCIENCE

Biochemistry

Joel Kenneth Kidd	Greenville
†***Mary Esther Milhous	Easley
Charles Edward Miller III	Mt. Pleasant
*Christie Ann Parrish	Rock Hill

Chemistry

Melissa Leigh Bomar	Spartanburg
Kenneth Andrew Caldwell	Greenwood
***Lawrence James McClure, Jr.	Goose Creek
Robert Franklin McCracken	Seneca
Samuel Carl O'Neal	Fayetteville, N. C.

Computer Information Systems

*Amy Lynne Abbott	Greenville
Robin Anne Burwell	Clearwater, Fla.
***Linda Lee Gerwig	Beaufort
Eric Edward Goodson	Greenville
Cynthia Ann Gross	Bridgewater, N. J.
Michael Alan Hahn	Wheaton, Ill.
David Alan Henson	Springfield, Va.
Tracy Cornelius Jewett	Palm Beach Gardens, Fla.
Sharon Alanna Scott	Calgary, Alberta, Canada
*Jennifer Kay Smith	Anderson
Laura Elizabeth Story	Lawrenceville, Ga.
Maria Travisano	Fernandina Beach, Fla.

Computer Science

Sheila Lynne Atkinson	Liberty
**Ann Maria Bagwell	Easley
***Spencer Britt Bailey	Hartwell, Ga.
**Melody Ann Batson	Pickens
Scott David Bergren	Dunwoody, Ga.
Joseph H. Blankenship	Orangeburg
Lee Vernon Boozer	Newberry
Margaret Ann Brandon	Clemson
†*Kevin Michael Brewster	Stone Mountain, Ga.
*Emily Jean Bridges	Greenville
James Edward Bruce, Jr.	Summerville
Deborah Ann Byars	Travelers Rest
Allen Webb Campbell	Blacksburg, Va.
Carl Rogers Cherry	Stuart, Fla.
Carol Elizabeth Church	Aiken
***Cori Letitia Coan	Duncan
*Dena Ann Coker	Cheraw
*Gina Rachelle Couch	Mauldin
*Marjorie Ann Darby	Summerville
LeaRae Rains Disher	Summerville
*Angela Dee Dominick	Columbia
**Lauri Ann Douglass	Greenville
*Randall Thomas Dykes	Kingsport, Tenn.
Robin Faulkner-Swing	Lexington, N. C.
*Kelly Lynne Ford	Gastonia, N. C.
Anton Palmer Fousek	Anderson
*Jennifer Hay Frampton	Mt. Pleasant
Robert Paul Graczyk	Columbia
*Stephen Edward Graham	Loris
*Thomas Barton Hannah	Pickens
Cynthia Rene Jamison	Oak Ridge, Tenn.
†***Mark Thomas Jones	Blacksburg, Va.
Jane Elizabeth Joseph	Aiken
Lisa Ruth Kiefer	Hilton Head Island
Donna Lynn Knight	Ridgeville
**Patricia Anne Komarek	Fort Mill
Michael Anthony Lang	Columbus, Ga.
Sheila Lynne Langford	Plantation, Fla.
Stephen Vance Lewis	New Bern, N. C.
Michael Joe Major	White Plains, Md.
Chesley Durham Martin	Anderson
**Mary Wellington McColl	Bennettsville
Martha Maria Miranda	Miami, Fla.
Ricky Gerald Motes	Anderson
Steven Alton Newton	Clemson
Lance Michael Nickles	Columbia, Md.
**Timothy Andrew Ozor	Roswell, Ga.
Douglas Kent Renwick	Clinton

Computer Science (continued)

**Elizabeth Lynne Richards	Oak Ridge, Tenn.
Leefa Elana Roe	Anderson
David Lawrence Sokoler	Holmdel, N. J.
**Barbara Alice Stearns	Greenville
Elizabeth Victoria Stortz	Spartanburg
Laure Eloise Strother	St. Petersburg, Fla.
*Deborah Renee Taylor	Whitmire
Richard Marvin Varner	Blacksburg
Troy Steven Waldrep	Anderson
***Alan Scott Ward	Anderson
Bradford George Webb, Jr.	Easley
*Dana Scott Williams	Dahlonega, Ga.
*Carl Henry Wist	Fort Mill
***Francis Michael Wood	Seneca
Arena Dunn Youtz	Greenville

Geology

William Roland Fleck	Pendleton

Mathematical Sciences

Barbara Jeanne Byelick	Tarrytown, N. Y.
Gregory David Cain	Camden
Melissa Sue Campbell	Liberty
Katherine Edwina Coxe	Seneca
Melanie Carol Marshall	Sumter
*Elaine Gay Middlebrooks	Chapin
Sonya Marie Miller	Seneca
†***Marcia Louise Nance	Columbia
Martha Brown Nicholson	Summerville
Kristin Louise Rahn	Evans, Ga.
†*Sean D. Ramsey	San Francisco, Cal.
Susan Diane Robertson	Greenville
*David Michael Schroeder	Glen Ridge, N. J.
Debra Carol Scott	Woodruff
Susan Paige Smith	Greer
*Branford Karen Strickland	Charleston
Kimberley Faith Ward	Toms River, N. J.
Heather Ann Watson	Wilmington, Del.

Microbiology

*Robbie Louise Beasley	Ringgold, Ga.
*Mary Helen Bosbyshell	Seminole, Fla.
Elizabeth Ann Brown	Anderson
**James David Dalton, Jr.	Summerville
David Archie Eads	Gaffney
Kevin Alan Edwards	Simpsonville
*Brian Andrew Farah	Charleston
*Marcia Elaine Guthrie	Summerville
Paul Waldemar Hund III	Charleston
Wade Hampton Johnston	Harleyville
Lisa Christine McCloy	Atlanta, Ga.
†***Douglas Edward McGill	Mt. Pleasant
Daniel Lee McKamy	Oak Ridge, Tenn.
*James David Schuman	Mt. Pleasant
*Allison Sentelle	North Augusta
*Judith Anne Tietze	Rockville, Md.
Charlton Whitfield Winchester IV	Greenville

Physics

†**Lawrence Neuman Connor III	Columbia
†**Michael Glenn Dowler	Sabillasville, Md.
†***Eric Knox Graben	Clemson
†**John Walter Lawson, Jr.	Clemson
†*Paul Everett Parker	Charleston
†***Wendy Lynn Schaffer	Clemson
†*James George Smith	Greenwood
†*Dowman Parks Varn	Camden

Zoology

Ronald Reid Barrett	Augsburg, W. Germany
Cassandra Lefaye Bishop	Florence
Timothy Carl Cater	Simpsonville
Sandra Joan Christianson	Monroeville, Pa.
*William Val Elbert	Reddington Shores, Fla.
Robert Lewis Hagan	Greenwood
Timothy John Jones	Summerville
Janet Marie Meyer	Central
Joe John Stephenson, Jr.	Winnsboro
*William Baskin Walkup, Jr.	Columbia
*John Tatum Watson	Bamberg

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*Cum laude: A grade point ratio of 3.40 to 3.69

**Magna cum laude: A grade point ratio of 3.70 to 3.89

***Summa cum laude: A grade point ratio of 3.90 to 4.00

†Senior Departmental Honors: The students so designated have earned a B or better in the six to twelve credits of honors work at the upper division level in a program designed by their department. They have maintained a minimum GPR overall of 3.40. They appear in the line of march with an honors medallion on an orange and purple ribbon.

MASTERS' DEGREES CONFERRED MAY 9, 1986

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURAL EDUCATION

Susan Elizabeth Alexander	Dallas, Texas
Terry Lee Cornett	Parkton, Md.
Mary Ann Lewis	Leesville
James Harmon Weldon	Florence

MASTER OF AGRICULTURE

Taiwo Hassan Rahji Bolaji	Kwara, Nigeria
Elvie Eskew Eaddy	Pamplico
Terry Quain Sudduth	Greer
Kathryn Denise Williams	Sikeston, Mo.

MASTER OF SCIENCE

Agronomy

Emmett Ernest Hiatt III	Lexington, N. C.
Mark Allen Isaacs	Georgetown, Del.
Vicki Lynn Ward	Mt. Prospect, Ill.

Animal and Food Industries

Gregory John Hulbert	Terre Haute, Ind.
Shih-Young Lee	Pingtung, Taiwan
Zoe Andrea Louvieri	Limassol, Cyprus
Beth Ann Zartman	Indian Rocks Beach, Fla.

Horticulture

Anthony Melton	McBee

Nutrition

Jane Clark Ellis	Isle of Palms
Julia Adele McAuley	Cayce
Eric Thomas Nield	Midland, N. C.

Plant Pathology

Eric Craig Tedford	Potsdam, N. Y.

COLLEGE OF ARCHITECTURE

MASTER OF ARCHITECTURE

Janette Sue Alexander	New Ellington
Joseph William Baker	Winter Park, Fla.
Linda Wood Berri	Central
Joseph Lockwood Brown III	Tucker, Ga.
Mark Gerard Clancy	Bowie, Md.
David LeRoy Dixon	Sumter
Allen Keith Edens	North Myrtle Beach
Ernest Edward Fava, Jr.	Athens, Ga.
Thomas Douglas Ferguson, Jr.	Mt. Pleasant
Gregory Howard Fitzpatrick	Poughkeepsie, N. Y.
Scott Lawton Garvin	Aiken
David Anthony Hill	Summerville
David Morris Hite	Charlotte, N. C.
Maury Whitfield Hurt	Orlando, Fla.
Charles Brooks Johnson, Jr.	Walhalla
Geoffrey Scott Kilgore	Greenville
Glenn Robert Lattanze	Tampa, Fla.
Wilbur Charles Martin	Beaufort, N. C.
Henry James Mehserle, Jr.	Pensacola, Fla.
Judith Elizabeth Nemeth	Columbus, Ohio
Steven Louis Peckham	Glendale, Wis.
William Phillips Platts	Ft. Pierce, Fla.
John Edward Robinson, Jr.	Springfield, Pa.
David Wayne Rogers	West Columbia
Amy Cecilia Spitzmiller	Fort Lauderdale, Fla.
David Merrill Taylor	Brevard, N. C.
Brian Ralph Titus	Peoria, Ill.
Peter Richard Wehner	Rochester, N. Y.

MASTER OF CITY AND REGIONAL PLANNING

Sharon Louise Richardson	Seneca
Julie Anne Strickland	Rome, Ga.
Bryan Douglas Wood	Spartanburg

MASTER OF FINE ARTS

Richard Alexander Lou	Imperial Beach, Cal.
George Gregory Place	Billings, Mont.
William Ronald Seitz, Jr.	Springfield, Ohio
Deborah Ann Sim	Washington, D. C.
Robert Benjamin Spencer	Clemson
Christopher Woods Velkoff	Orchard Lake, Mich.

COLLEGE OF COMMERCE AND INDUSTRY

MASTER OF BUSINESS ADMINISTRATION

John Robert Bourgeois	Greenville
Stephen Wallace Coyle	Gaffney
Catherine Lynn Davidson	Enoree
James Clifton Edwards, Jr.	Greenville
Markus T. Farrenkopf	Columbus, Ohio
Mattison Ward Harris	Greenwood
Robert Sherman Hudson	Greenville
Ruth Roper	Greenville
Steven Jackson Timmons	Greenville
Robert Edward von Sprecken, Jr.	Charlotte, N. C.
Thomas Jack West	Toledo, Ohio
Robin Bruce Williams	Clearwater, Fla.

MASTER OF PROFESSIONAL ACCOUNTANCY

Dakon Hope Moss	Gaffney

MASTER OF ARTS

Economics

Mahua Barari	Calcutta, India

MASTER OF SCIENCE

Industrial Management

Paul Thomas Cross	Marion, N. C.
Thomas Alan Hutchins	Spartanburg
Bolanle-Fehintola Oguntomilade	Lagos, Nigeria
Kevin Weldon Sightler	Anderson
Gary Joseph Wortkoetter	Greenville

Textile Chemistry

Bobby Dean Bagby	Cumming, Ga
Caibao Qian	Wuxi City, Jiang Su, China

Textile Science

Judith Ann Frost	New City, N. Y.
Susan Gail Hastings Keesee	Bethesda, Md.

COLLEGE OF EDUCATION

MASTER OF EDUCATION

Administration and Supervision

Douglas Miron Dacko	Travelers Rest
Susan Lee Jenkins	Spartanburg
Kenneth John Mitta	Raleigh, N. C.
Paul Correll Pressley	Greenville
Itlean Hamilton Wilson	Manning

Counseling and Guidance Services

Nora Brown Acton	Seneca
Gwendolyn Dianne Baity	Easley
Madeline Fortune Blackwell	Alexandria, Va.
Norma Foster Caldwell	Spartanburg
Karen Britton Clinkscale	Taylors
Ronald Wayne Coffman	Winchester, Va.
Marilyn Perry Collins	Easley
Angela Lee Garrison	Sandy Springs
Jane Smith Gibson	Greenville
Kay Rish Gregory	Greenwood
John Leslie Griffin, Jr.	Anderson
James O'Neal Howell	Clemson
Julia Elizabeth Lee-Breazeale	Anderson
James Thomas Mabry, Jr.	Spartanburg
Charles Stuart Sanford	Clinton
John Mitchell Seybold	Morristown, N. J.
Margaret Kelly Shank	Marion
James Edward Sheridan	Fort Lauderdale, Fla.
Evelyn Irene Sloger	Anderson
Debra Charping Sparacino	Clemson
Alice Marie Tinsley	Fountain Inn

Elementary Education

Trudy Bland Brewington	Newberry
Geralyn Fulmer Brooks	Greenwood
Wanda Jeffreys Brown	Raleigh, N. C.
Margaret Shores Farley	Due West
Sanya Renee Martin	Hanahan
Susan Crenshaw McManus	Abbeville
Lisa Miller Patton	Greenville
Linda Mize Powell	Anderson
Jeanette Plumley Price	Lyman
Cheryl Busick Rudisill	Spartanburg
Katrinka Barker Stevenson	Townville
Beth Wade Tucker	Central

Reading

Evie G. McAlister	Hemingway
Athleen Todd Sharp	Walhalla

Secondary Education

Scott William Kosanke	Anderson
Cheryl Lynne Rumminger	Greenville

Special Education

Valarie Martin Ellison	Six Mile
Carolyn Wofford McElmurray	Clemson
Lisa Jean Wagner	Camp Springs, Md.

MASTER OF INDUSTRIAL EDUCATION

Ronald William Grant	Pickens

COLLEGE OF ENGINEERING

MASTER OF SCIENCE

Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

Kendall Flint Holbrook	Lexington, Ky.
Perng-Kwei Keith Lei	Chung-Ching, Shy-Chuan
Robert Lewis Patrick	St. George
Peter Winston Sites	Epharata, Pa.

Bioengineering

Tony Alan Cutshall	Des Plaines, Ill.

Ceramic Engineering

Jeffrey Randall Price	Taylors
Carey Alan Towe	Belvedere
Paul Morgan Vernon, Jr.	Travelers Rest

Civil Engineering

Michael Lee Hessig	St. Meinrad, Ind.
John Thomas McEntire, Jr.	Irmo
Francisco Jose Pieretti	S. J. Morros, Venezuela
Bryan Thomas Readling	Columbia
Duncan Campbell Seaman	Kill Devil Hills, N. C.
Scott Eugene Sonnenberg	Greenville

Computer Engineering

Veton Zija Kepuska	Prishtine, Yugoslavia
Mohammed Feizal Mohideen	Colombo, Sri-Lanka
Kevin Craig Redmon	Stow, Ohio
Ronald Wayne Sluder, Jr.	Cheraw
Ching-Yurn Tien	Clemson
Hwang-Ruey Wang	Taipei, Taiwan
Kuoging Yuan	Clemson

Electrical Engineering

Han Kyou Cheon	Seoul, Korea
Julius King-Ling Goh	Singapore
Robert Scott Henry	Toccoa, Ga.
Chin-Feng Lin	Wanglaung, Taiwan
Fred Ephraim Locklair	Charleston
James Keith McElveen	Hartsville
Premal Vijay Parikh	Ahmedabad, India
Oscar Luis Paz	Cochabamba, Bolivia
John Bryan Pletta	Seneca
Michael Scordilis	Corfu, Greece
Alvin Macon Stinson III	Attalla, Ala.

Environmental Systems Engineering

Joseph Andrew Greenburg	Richmond, Va.
Timothy Mark Owens	Holden Beach, N. C.

Mechanical Engineering

Jenming Mike Chiang	Clemson
Pradeep Samuel David	Bangalore, India
Robert Lee Dorroh, Jr.	Silverstreet
Sanming Michael Huang	Taichung, Taiwan
Leonard Scott Lindner	Springdale, Ohio
Chandru Ramanarayanan	Madras, India
Saied Taheri	Tehran, Iran
Bor-Jang Tsai	Tainan, Taiwan
Yaw Tzong Jerry Yang	Taipei, Taiwan

COLLEGE OF FOREST AND RECREATION RESOURCES

MASTER OF FORESTRY

Mark Kevin Augspurger ---------- Frankfort, Ky.

MASTER OF SCIENCE

Forestry

Steven James Danielovich ------ Waterford, Ct.

COLLEGE OF LIBERAL ARTS

MASTER OF ARTS

English

Melvin Ray Wininger ------------------ Central

COLLEGE OF NURSING

MASTER OF SCIENCE

Family Health Nursing

Remonia Levant Ashmore ----------- Greenville
Nancy McDonald McManus ------- Mt. Airy, Ga.

COLLEGE OF SCIENCES

MASTER OF SCIENCE

Botany

David Ray Anderson -------- Three Springs, Pa.
Mary Middleton Smith ------------ Mt. Pleasant

Chemistry

Ruth Marie Felland -------------- Wilmot, Ohio

Computer Science

Frances Talbert Barnes -------------- Rock Hill
Wan-Ting Hsieh --------------- Tainan, Taiwan
Sami Bishara Morcos --------------- Greenville
Jit Singh Sangha --------- Jandusingha, Punjab
Young-Yi Tan ------------------------- Taiwan

Mathematical Sciences

Douglas John Hentschel -------- Portage, Mich.
Betty Love Hickman ------------------ Olla, La.
William Marshall Hunt --------- St. Joseph, Mo.
Susan Beth Price -------- North Syracuse, N. Y.
Virginia Ann Rice -------------- Marshall, N. C.
Carol Jean Swanson ------------- Lenoir, N. C.
Lesa Laverne Tapp ----------------- Dixon, Ky.

Physics

Carl Timothy Drake ------------ Jackson, Miss.
Thomas Jeanotte Pickett ------- Lewiston, Idaho

Zoology

Gayle Kathleen Christopher --------- Peru, Ind.
Daniel Timothy Gerber --------------- Clemson

DOCTORS' DEGREES CONFERRED MAY 9, 1986

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY

Applied Economics

Coleman Walter Dangerfield, Jr. ---------- Moncks Corner
B.S., M.S., Clemson University
Dissertation: The Market for Flue-Cured Tobacco Quota in South Carolina — An Econometric Approach to Risk Analysis

Horacio Soberon-Ferrer ---------- Puebla, Mexico
License in Actuarial Science, National University, Autonoma, Mexico; M.S., Clemson University
Dissertation: Land Tenure and Economic Efficiency: The Case of Mexico

Entomology

Joseph Kovach ---------- Euclid, Ohio
B.A., Miami University; M.S., Clemson University
Dissertation: Life Cycle, Seasonal Distribution and Tree Responses to Scolytid Beetles in South Carolina Peach Orchards

Lisa Ann Lemke ---------- Lowell, Mass.
B.S., Purdue University; M.S., Pennsylvania State University
Dissertation: Biological Studies, Control Investigations, and Public Attitudes Regarding the Red Imported Fire Ant, **Solenopsis invicta** Buren (Hymenoptera: Formicidae), in South Carolina

Plant Physiology

Lambert Blanchard McCarty ---------- Batesburg
B.S., Clemson University; M.S., North Carolina State University
Dissertation: Growth and Development of Tall Fescue and Bermuda Grass as Influenced by Environmental and Cultural Factors

COLLEGE OF COMMERCE AND INDUSTRY

DOCTOR OF PHILOSOPHY

Industrial Management

Gordon Wade Arbogast ---------- Clemson
B.S., United States Military Academy; M.S., Georgia Institute of Technology
Dissertation: The Effect of Trace on Cost Overruns and Development Time for Army Weapon System R&D Programs

Management Science

Anthony John Perticone ---------- Jackson, Mich.
B.A., Kalamazoo College; M.S., Clemson University
Dissertation: Design and Analysis of Telecommunications Networks

Textile and Polymer Science

Linda Gay Cote ---------- College Station, Texas
B.S., M.S., George Washington University
Dissertation: A Study of the Kinetics of Cold Pad Batch Dyeing with Fiber Reactive Dyes Using High Performance Liquid Chromatography

COLLEGE OF EDUCATION

DOCTOR OF EDUCATION

Vocational and Technical Education

Joe Henry Bowers ---------- Greenwood
B.B.A., M.B.A., North Texas State University
Dissertation: The South Carolina Technical College System: A Study of Perceived Value for Industry Location

Lorraine Rodrigues Fisher ---------- Pendleton
B.S., University of Bridgeport; M.A., University of South Florida; M.S., Clemson University
Dissertation: Dacum Process: A Method for Identifying Competencies for Technical Nursing Education

James Cleo Miller, Jr. -- Seneca
B.S., M.Ag., Clemson University
Dissertation: South Carolina Legislators' Perceptions of the Clemson University Cooperative Extension Service

Emma McIntosh Owens -- Clemson
B.S., Morris College; M.S., The George Washington University
Dissertation: Prediction of Success in Entry Level Mathematics Courses at Tri-County Technical College

Linda Marianne Taylor -- Woodruff
B.A., Limestone College; M.A., Clemson University
Dissertation: Brain Dominance and Learning Style Preference: Their Relationship to Student Success in Selected Classes at Tri-County Technical College

COLLEGE OF ENGINEERING

DOCTOR OF PHILOSOPHY

Engineering

Kyung-Whan Kim -- Gyeongsangnam-Do, Korea
B.S., Gyeong Sang National University; M.S., Seoul National University
Dissertation: Development of Warrants for Left-Turn Lanes at Unsignalized Intersections in Korea (Field of Specialization: Civil Engineering)

William John Park, Jr. -- Greenwood
B.S., M.S., Clemson University
Dissertation: An Investigation of Maximum Length Linear Recursive Sequences over Finite Fields (Field of Specialization: Electrical Engineering)

COLLEGE OF SCIENCES

DOCTOR OF PHILOSOPHY

Chemistry

Panolil Chirukandoth Raveendranath -- Paral, Kerala, India
B.S., University of Kerala; M.S., University of Madras
Dissertation: Stereoselective Synthesis of (±)-Isocelorbicol

Mathematical Sciences

William J. Kovalcik -- Indiana, Pa.
B.S., Indiana University of Pennsylvania
Dissertation: A Lumped Parameter Model of Evaporation-Condensation Driven Convective Flows in Atmospheric Environments

Kenneth Walter Peters, Jr. -- Glenshaw, Pa.
B.A., The College of Wooster; M.S., Clemson University
Dissertation: Theoretical and Algorithmic Results on Domination and Connectivity

Zoology

Jeannette Ellen Doeller -- Severna Park, Md.
B.S., M.S., Clemson University
Dissertation: A Study of Gill Hemoglobin of the Nearly Gutless Bivalve **Solemya velum** Say (Protobranchia)

Paul Albert Giammatteo -- Newark, Del.
B.A., University of Delaware; M.S., University of Georgia
Dissertation: On the Application of Chemical Equilibrium Models to tho Prediction of Phosphate Availability for Algal Growth

David William Kraus -- Wilmington, Del.
B.S., University of Delaware
Dissertation: Neurohemoglobin Function in Relation to Nervous Activity in **Tellina alternata**: A Comparison with the Hemoglobin-free Nervous System of **Tagelus plebelus** (Mollusca, Bivalvia)

Debora Langley Mann -- Pompano Beach, Fla.
B.S., University of Miami; M.S., Vanderbilt University
Dissertation: Consequences of Gynogenesis for the Population Dynamics of **Alsophila pometaria** (Lepidoptera: Geometridae) in the Southern Appalachians

Carroll Lloyd Missimer III -- Lebanon, Pa.
B.A., B.S., Lebanon Valley College; M.S., Clemson University
Dissertation: Nonseasonal Mixing: Its Influence on the Distribution, Abundance, and Succession of Phytoplankton

BACHELORS' DEGREES CONFERRED AUGUST 9, 1986

COLLEGE OF AGRICULTURAL SCIENCES

STEPHEN RICHARD CHAPMAN, Acting Dean

BACHELOR OF SCIENCE

Agricultural Economics and Rural Sociology

Jarvis Russell Craven ---------- Round O
Kenneth Deese McCaskill ---------- Bethune

Agricultural Education

David Wister Howe, Jr. ---------- Orangeburg

Agronomy

Joseph Lewis Cummings ---------- Lodge

Animal Industries

Bert Stacy Godwin ---------- Lake City
Sylvia Jean McCurry ---------- Walhalla

Economic Biology

Jeffrey Neal Crisp ---------- Greenville
Randell Keith Haney ---------- Pickens

Horticulture

Paul Terrell Jett ---------- Columbia
Thomas Hough Vaughan, Jr. ---------- Anderson

COLLEGE OF ARCHITECTURE

JAMES FRAZIER BARKER, Dean

BACHELOR OF ARTS

Design

Robert Entenza ---------- Boca Raton, Fla.

BACHELOR OF SCIENCE

Building Science and Management

John Joseph Brunner ---------- Colts Neck, N. J.
Gerald Kenneth Jefferson ---------- Trenton
Ryan Sidney McCormick ---------- Darlington

Design

Mohammad Hossein Mahmoodi ---------- Greenville
Michael Joseph Malloy ---------- Port Washington, N. Y.

COLLEGE OF COMMERCE AND INDUSTRY

RYAN CUSTER AMACHER, Dean

BACHELOR OF ARTS

Economics

Robert John McCardle, Jr. ---------- Columbia
Joel Brian Sweeney ---------- Altamonte Springs, Fla.

BACHELOR OF SCIENCE

Accounting

Mary Kay Briskey ---------- Roanoke, Va.
Jocelyn Marie Burns ---------- Ellicott City, Md.
Jennifer Russell Clark ---------- Aiken
Harry Roy Davis ---------- Mt. Laurel, N. J.
Craig Newton Elliott ---------- Greenville
Joel Alan Ellison ---------- Williamston
Lisa Ann Finley ---------- Anderson
John Francis Kuppens ---------- Charleston
Cynthia Ann Pasley ---------- Atlanta, Ga.
Allison Elizabeth Pratt ---------- Charlotte, N. C.
Catherine Ann Price ---------- Greenville
Jeffrey Philip White ---------- Pittsburgh, Pa.

Economics

Elizabeth Caroline Apple ---------- McCormick
Cindra Leigh Bell ---------- Hanahan
Kenneth Randal Bradshaw ---------- Anderson
*Linda Anne Carney ---------- Westlake, Ohio
Michael Brabham Crews ---------- Hampton
Shirley Sholar Davis ---------- Newport News, Va.
Claire Elizabeth Hance ---------- Union

Financial Management

Paul Scott Allen	Greenville
Scott Montgomery Allison	Clemson
Victoria Lynn Brown	Blacksburg, Va.
**Melinda Kay Evatt	Easley
Matthew Truman Fallaw	Columbia
Scott Andrew Fogle	Corry, Pa.
John Ross Gaillard	Walhalla
James Linwood Gibbs	Columbia
Caroline June Harrast	Cincinnati, Ohio
Nancy Ann Hinton	Maitland, Fla.
Alice Kay Holder	Greenville
Michael Anthony Holtzer	Greenville
Donald Arthur Hough	Falls Church, Va.
Sherri Lynn Hughes	Atlanta, Ga.
Gary Neal Kyber	Tampa, Fla.
Robert Buchanon Mears, Jr.	McCormick
Donald Lee Reeder, Jr.	Greenville
Gregory McKeithen Smalls	Walterboro
Diana Leigh Stewart	Blackville
Stuart Keith Thornton	Greer
David Richard Torris	Pittsburgh, Pa.

Industrial Management

Christopher Phillip Bird	Greenville
Tamara Lynn Bonner	Greenville
Robert Campbell	Westminster
William Ricky Feltman	Starr
Larry Montgomery Johnson	Graniteville
Patrick Bouvier Keese	Pendleton
Robert Allen Solomons	Allendale
*Steven Vance Walton	Mt. Pleasant
Mary Kathleen Williams	Roswell, Ga.

Management

Thomas Edward Boswell	Monticello
Walter Marsh Burckhalter, Jr.	Aiken
Tamma Waldrop Carson	Greenville
Mark Wesley Childs	Pickens
Catherine Cline	Marietta, Ga.
Jeffrey David Collins	Myrtle Beach
Mark Albert Garrison	Sandy Springs
Joe William Getsinger	Shelby, N. C.
Hollis Derrill Hall	Seneca
John Ashley Harris	Seneca
Susan Ellen Hayes	Upper Marlboro, Md.
Philip D'Oyley Holford, Jr.	Greenville
Francis Gaillard Johnson	Charleston
Labon Chappell Jones, Jr.	Florence
Joseph Albert Lazowski	Setauket, N. Y.
John Clive Lee	Coventry, England
James Pringle Macfie, Jr.	Camden
Victoria Ann Neal	Clemson
Christy Lynn Nix	Williamston
Charles William Owen, Jr.	Clemson
Paula Neill Rosser	Charlotte, N. C.
Timothy Allen Sizemore	Greenville
Sean Joseph Storey	Camden
Jon Ira Team	Lugoff
Katherine Ida Thrash	Summerville
Sarah Ann Twiggs	North Augusta
Dennis Raymond Waldrep	Greenwood
*Kirsten Nelson Wallace	Seneca
Paige Weeks	Aiken
Richard Theodore Weil, Jr.	Isle of Palms
Helen Amelia White	Greenville
Nancy Camille Wyman	Estill
Darcelle Yoakam	Columbus, Ohio
Grant William Zerbe	Sea Girt, N. J.

BACHELOR OF TEXTILE TECHNOLOGY

Gregory Thomas Achille	Greenville
William Scott Harbin	Easley
Benedict Olusola Popoola	Kansas City, Mo.
Kimberly Jeane Pricer	Oakwood, Ill.

COLLEGE OF EDUCATION

JAMES EDWARD MATTHEWS, Dean

BACHELOR OF ARTS

Early Childhood Education

Jennifer Bond Matthews	Clemson
Earnestine Robinson Williams	Mullins

Elementary Education

Lynn Thomas Eversman	Union
Susan Parler Gasque	Elloree
Lisa Anne Johnson	Anderson
***Lisa Jolley Jones	Greer
Shawn Cherri Oakley	Roswell, Ga.
Elizabeth Grace Phillips	Pageland
Robin Quattlebaum	Saluda

Secondary Education

Tammy Sue Alexander	Tamassee
***Penelope Gurley Hill	Iva
Jonie Marie James	Travelers Rest
Gretchen Philaine Pace	Easley
Calla Eileen Rowell	Spartanburg
Martha Elizabeth Stewart	Rock Hill

BACHELOR OF SCIENCE

Graphic Communications

Douglas Ellis Beckman ------------- Columbia
Dawn Sabrina Cantrell ------------- Greenville
Robert Edward Delgado -------------- Beaufort
Robert Shepherd Harris -------------- Clemson
***Denise Walsh Miller ----- Dewey Beach, Del.
Betty Lorraine Thomas -------------- Columbia

Industrial Education

Richard Dwayne Butler ----------- Ware Shoals
Thomas Dewayne Chandler ------ Ringgold, Ga.
Cary John Massaro ----------- Canonsburg, Pa.
Danny Winfred Moss -------------- Blacksburg
William Anthony Pitts ---------------- Belton
Ronald Ray Shaw ------------------ Anderson
Roland Scott Simpkins -------------- Woodruff

Science Teaching

William Michael Isaacs --------------- Pickens
Rita Ralphele Revels ----------------- Easley

COLLEGE OF ENGINEERING

JOSEPH CHARLES JENNETT, Dean

BACHELOR OF SCIENCE

Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

Richard Edward Gettys, Jr. ---------- Hartsville
Michael Lynn Satterwhite ------------- Central

Chemical Engineering

Anne Renee Boudreaux ---------- Newark, Del.
*Eric Vincent Brown ---------------- Williston
William Baird Cagle, Jr. ------- Asheville, N. C.
Michael William Kidd ----------------- Aiken
Wesley Keitt Wannamaker, Jr. ---- St. Matthews

Civil Engineering

Heather Jean Bartlett ------------------ Clover
Timothy Boyd Callenback ----------- Anderson
Mark Albert Coleman -------------- Charleston
*Thomas Robert Decker -------- Hamburg, N. J.
Louis Bator El-Zoghbi -- Daar-Bechtaar, Lebanon
Timothy Robert Kiser ----------------- Smyrna
James Donald Shelton, Jr. ---------- Greenville
Alice Marie Stewart ------------------ Seneca
Frederick Lowry Williams -------- Decatur, Ga.

Computer Engineering

Julian Randolph Abbott, Jr. ---------- Walhalla
William Alan Bercik
----------- --- Djibouti, French Somaliland
James Albert Cope, Jr. -------------- Hampton
Douglas Earle Foster ---------------- Taylors
Robert Leon Paxton ------------- Simpsonville
*Chris Edward Pepper ------------ Williamston
David Leroy Snider ---------------- Anderson
Melinda Kaye Still ---------------- Charleston

Electrical Engineering

Steven Clark Buzhardt -------------- Batesburg
Don Alan Davis ------------------ Greenwood
Kellie Lynne Elliott ----------- Pittsburgh, Pa.
Carlise Renee Gathers ------------- Charleston
Peyton Samuel Greene ------------- Pendleton
**Timothy Andrew Griffin ----------- Anderson
Gregory Scott Harding ---------- Rockville, Md.
Brian Wesley Jones ------------------- Dillon
**Stewart William Jordan ----------- Rock Hill
Patricia Ellen Metro ------------ Seminole, Fla.
Patrick Mark O'Brien --------------- Anderson
Wayne James Parris, Jr. ------------- Chesnee
Russell Bradley Roberts ------------- Anderson
Eric Gerard Sachon -------------- Spartanburg
*David Grant Shively ---------------- Clemson
Teresa Susan Stone ------------- Isle of Palms
Don James Yarid -------------------- Seneca
Walter Harral Young III -------------- Camden
Victor Omar Zambrano ----- Guayaquil, Ecuador

Engineering Analysis

Jamie Angela Johnson ---------- Brevard, N. C.

Engineering Technology

Jeffrey David Bergman ------------- Anderson
Paul Lawrence Deal -------------- Charleston
Edwin Marlon Drose, Jr. ----------------- Irmo
*Tony Wayne Duncan -------------- Walhalla
Steven Todd Ferrell -------------------- York
Charles Frederick Isaacson -------- Charleston
Paul Haden Justice III ------------- Greenville
William David Rupp ----------------- Clemson
Marvin Walker Weathers III ------- Spartanburg
William Mauldin Williams, Jr. --------- Varnville
Alan David Woods -------------------- Easley

Industrial Engineering

Richard Casey Fitzgerald	Summerville
**Robert Keith Gerwig	Beaufort
Cem Yegul	Izmir, Turkey

Mechanical Engineering

Timothy Clinton Alexander	Anderson
Donald Mark Bailey	Easley
Jeffrey Alan Ball	Valrico, Fla.
Beryl Dwayne Creech	Enoree
Kelly Bennett Duke	Greenville
Robert Ervin Edwards III	North Charleston
Christopher Scott Goodrich	Cocoa Beach, Fla.
Frank Ormand Jones, Jr.	Rock Hill
James Edward Lamb	Denmark
John Burriss Lowry	Cairo, Ga.
James Walter McCarthy	Kettering, Ohio
Joseph Charles McCarthy	Rockville, Md.
Thomas Rickie McLean	Belmont, N. C.
David Eugene Medlin	Greenville
Frederick Plenge, Jr.	Taylors
Donald Darrell Shue, Jr.	Clinton
Kris Wyatt Smith	Columbia
Stacy Neil Smith	Greer
James Floyd Summer	Little Mountain
David Derek Wilson	York, Pa.
Christopher R. York	Anderson

COLLEGE OF FOREST AND RECREATION RESOURCES

BENTON HOLCOMB BOX, Dean

BACHELOR OF SCIENCE

Forest Management

Jarvis Coles Barnwell	Clemson
William Timothy Brockman	Camden
John Edward Crain, Jr.	Aiken
Jeffrey Allen Griffith	Simpsonville
Joey Dan Hilliard	Heath Springs

Parks, Recreation, and Tourism Management

Jane Elizabeth Anderson	North Charleston
*Monty Blane Baldwin	Stone Mountain, Ga.
Barbara Jane Barker	Westminster
Elizabeth Ashley Batson	Greenville
Monica Marie Beam	Gastonia, N. C.
Donna Lynn Bowling	Athens, Ga.
Amy Louise Campbell	Fairfax, Va.
Catherine Ann Chiola	Sullivan's Island
Gordon Lee Clark	Anderson
Mark Douglas Davis	Columbia
Christine Michelle Dwelle	Auburn, Cal.
Gloria Lynne Farrell	Prosperity
Gregory Joseph Fleming	Tequesta, Fla.
Dicksie Ward Gregorie	Charleston
Adrienne North Gunby	Jacksonville, Fla.
Leslie Kristine Kellett	Greenville
Rachel Kathryn Kendrick	Union
Russell Todd Kullmar	Lake Worth, Fla.
Mary Ann Lee	Greenville
Morgan McCall Molthrop	New Orleans, La.
Caroline Heidi Morton	Beaufort
Toni Marie Moses	Jacksonville, Fla.
Dana Lynn Pitts	Greenville
*David Brian Proctor	Hendersonville, N. C.
Rebecca Elizabeth Reynolds	Chattanooga, Tenn.
Lori Jean Sapp	Rock Hill
Laura Elizabeth Starbuck	Atlanta, Ga.
Susan Diane Stukey	Charleston
Shelly Louise Sykes	Wheaton, Md.
David Michael Tarrant	Greenville
Stephanie Lee Venable	Columbia
Dora Lynn Voigt	Spartanburg
Marian Reser Wardlaw	Anderson
Matthew Brian Williams	Swansea
Felicia Nannette Wilmore	Columbia

Wood Utilization

Mark Ramsay Grant	Marion, N. C.
Patrick Elliott Westbrook	Monticello
Robert Paul Wolfe	Mt. Pleasant

COLLEGE OF LIBERAL ARTS

ROBERT ALFRED WALLER, Dean

BACHELOR OF ARTS

English

Karen Patricia Barnes	Charleston
Sharon Amick Black	Prosperity
Michael William Dodd	Clemson
Cassia Ruth Gordon	Taylors
Margaret Diane Minuth	Mathews, Va.
Catherine Anne Rogers	Asheville, N. C.
Patricia Ann Tuttle	Sumter
Victor Daniel White III	Timmonsville

Modern Languages

Heidi Gaye Phillips ------------------ Gaffney

Political Science

Rita Lenette Blanton -------------------- Loris
Donna Ruth Edwards --------------- Anderson
John Newman Howe II ------------------- York
Holley Jean Kortan --------------- Atlanta, Ga.

Psychology

Athina John Psomas ---------------- Columbia
*John Steven Shealy ----------------- Seneca
Michelle Constance Simmons ------- Charleston

Sociology

Timothy R. Caples ---------------- Wilton, Ct.
Lisa Darlene Crum -------------------- Easley
Sharon Arlease Cunningham ----------- Seneca
Stephanie Field Trotter ------------- Greenville

COLLEGE OF SCIENCES

HENRY ELLIOTT VOGEL, Dean

BACHELOR OF ARTS

Geology

David William Brown ---------------- Clemson

Mathematical Sciences

Frances Celeste Kelly --------------- Anderson

BACHELOR OF SCIENCE

Computer Science

*Mark Austin Brown ------------------ Seneca
Mary Elizabeth Fox ------------- Rockville, Md.
Thomas Ervin Elliott ---------------- Greenville
Deborah Elaine Hardin -------------- Cleveland
Anita Darlene McCombs --- Sherrills Ford, N. C.
Ronnie Jimmy Price ---------------- Anderson
William Michael Revels ---------- Mt. Pleasant
Scott Edward Slayback III --------- Miami, Fla.
Timothy Bryan Tucker ------------ Summerville

Geology

Teresa Ann Chaput --------------------- Aiken

Mathematical Sciences

Joseph Scott Frazier ------------------- Easley
Robin Renee Gilbert ----------------- Florence
Jennifer Lynn Hayne ------------ Summerville
Susan Amanda Huggins --------------- Nichols
Tracy Allison Martini ---------------- Columbia
Brian Lamar Ratchford ----------- Spartanburg
Lisa Carolyn Stannard -------------- Greenville
Jeffery Tillman Thompson ---------- Greenville

Medical Technology

Elaine Kathleen Lorelle ---------- Dayton, Ohio
Jane Coker McAmish -------------- Greenwood
*Sharon Louise Miller ------------- Hemingway

Microbiology

Margaret Elizabeth Doss -------- North Augusta
Scott Andrew Williams ---------------- Taylors

Pre-Professional Studies

***Matthew Kelley Cline ---------- Atlanta, Ga.

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*Cum laude: A grade point ratio of 3.40 to 3.69

**Magna cum laude: A grade point ratio of 3.70 to 3.89

***Summa cum laude: A grade point ratio of 3.90 to 4.00

†Senior Departmental Honors: The students so designated have earned a B or better in the six to twelve credits of honors work at the upper division level in a program designed by their department. They have maintained a minimum GPR overall of 3.40. They appear in the line of march with an honors medallion on an orange and purple ribbon.

EDUCATION SPECIALIST AND MASTERS' DEGREES CONFERRED AUGUST 9, 1986

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURAL EDUCATION

Jesse Adams III	McColl
Jacob Lawton Carter, Jr.	Westminster
York L. Glover	St. Helena
David Earl Jensen	Clemson

MASTER OF AGRICULTURE

Radhakrishnan Srinivasan	Pondicherry, India

MASTER OF NUTRITIONAL SCIENCES

Sharon Kay Edgeworth	Cheraw

MASTER OF SCIENCE

Agricultural Economics

George Carroll Davis	Denmark
Daniel Agbemey Morvey	Klikor, Ghana
William Scott Whiteside	Pelzer

Agronomy

Henderson Medson Chimoyo	Lilongwe, Malawi

Animal and Food Industries

James Earl Lassiter	Clemson
Scott Lee Schaake	Lawrence, Kansas
Heeyoung Tai	Seoul, Korea

Entomology

David Edward Scotten	Aiken

Horticulture

Charles Harold Matthews, Jr.	Clemson

Nutrition

Claudia Corbin Meadows	Brunson

Wildlife Biology

Katherine Angela Boyle	New York, N. Y.
Shari Ann Lunardini	Erie, Pa.

COLLEGE OF COMMERCE AND INDUSTRY

MASTER OF BUSINESS ADMINISTRATION

James Edward Bagwell	Piedmont
Bobby Reginald Clark, Jr.	Floyd, Va.
Corinna M. de la Burde	Richmond, Va.
Richard Michael Eppley, Jr.	Charlotte, N. C.
Jeffrey Richard Gilbert	Tucker, Ga.
Lynne Sweet McIntosh	Hendersonville, N. C.
James Richard Murray, Jr.	Salem, Mass.

MASTER OF PROFESSIONAL ACCOUNTANCY

Rachel Preusz Gulledge	Central
Ramey Gillespie McGuigan	Greenville
Carolann McVey	Florence
Deborah Ann Newell	De Land, Fla.
Richard Byron Skelton	Greer
Richard Everson Wolcott	Greenville

MASTER OF ARTS

Economics

Cynthia Annette Brown	Stone Mountain, Ga.
Jeffrey Lee French	Simpsonville
Jody Woods Lipford	Florence
Sarah James Uhlmchuk	Greenville

MASTER OF SCIENCE

Industrial Management

Thierry Yves Olivier Cardy ---------- Lau-Balagnas, France
Phillippe L. R. Cochard ---------- Cuisery, France
David Allan Gray ---------- Pensacola, Fla.
Joelle Maryvonne Le Goefflec ---------- Pau, France
Frederic Xavier Rande ---------- Pau, France
Cheryl Theobald ---------- Fort Mill

Textile Chemistry

Kay McMahan McCoy ---------- Ware Shoals

Textile Science

Ann Griesinger ---------- Wilmington, Del.

COLLEGE OF EDUCATION

EDUCATION SPECIALIST

Administration and Supervision

Linda Paramore Noeldechen ---------- Seneca

MASTER OF EDUCATION

Administration and Supervision

Deryl Lee Craven ---------- Clinton
Sherwin Lee Johnson ---------- Calhoun Falls
Bobby Moore Lutz ---------- Denver, N. C.
Debra Ann McDowell ---------- Ninety Six
Edward Findley Smith ---------- Anderson
David Scott Thomas ---------- Newberry
Torie Christopher Tourtellot ---------- Greenville

Counseling and Guidance Services

Suzan Elise Allen ---------- Central
Connie Evatt Bagwell ---------- Seneca
Valerie Ann Bresette ---------- Mauldin
JoAnn Musto Brink ---------- Central
Angela Kelly Brown ---------- Anderson
Cornelia Neubia Chambers ---------- Piedmont
Vicki Hawkins Corn ---------- Greenville
Marjorie Lisa Creciun ---------- Iva
Dennis Harper Davenport ---------- Hickory Tavern
Amy Holliday Davis ---------- Greenwood
Gwendolyn Faith Dorr ---------- Greenville
Rebecca Lynne Durham ---------- Pickens
Parniece Allen Foster ---------- Piedmont
Hollace Anne Hinson ---------- Irmo
Judith Ann Huffman ---------- Tyner, Ind.
Janis Gerrard Hunter ---------- Anderson
Elizabeth Greene McKinney ---------- Greenville
Donald Boyd Pearson, Jr. ---------- Clemson
Kathleen Mary Sawtelle ---------- Clemson
William Lewis Sherbert ---------- Greenville
Claire Withey Smith ---------- London, England
Cynthia June Smith ---------- Seneca
Sondra Lori Smith ---------- Spartanburg
Jennie Auten Yon ---------- Calhoun Falls
Daniel Paul Zielinski ---------- Clemson

Elementary Education

Sharon Mitchell Bates ---------- Anderson
Sandra Patterson Bradshaw ---------- Honea Path
Michael Wayne Fleming ---------- Hartwell, Ga.
Stella Taylor Gambrell ---------- Anderson
Mary Rogers Haynes ---------- Anderson
Judith Moseley Lassiter ---------- Lumberton, N. C.
Sue Garrard Miller ---------- Newberry
Carole Lee Monroe ---------- Central
Gail Wilson Nicholson ---------- Pickens
Nancy McBride Philyaw ---------- Anderson
Windy Kelly Satterwhite ---------- Central
Jane Pitts Sexton ---------- Piedmont
Sandra Fagg Strickland ---------- Anderson
Donna Carole Taylor ---------- Easley
Joyce A. Willis ---------- Central
Linda Blackburn Woelfel ---------- Clemson

Reading

Jo Ann Dillard Cochran ---------- Six Mile
Alice West Foutz ---------- Central
Joyce Monica Houck ---------- Philadelphia, Pa.
Beth Jones Kelly ---------- Abbeville
Lee Ann Pennscott ---------- West Union
Carol Brown Sears ---------- Anderson
Jean Thomason Wilder ---------- Simpsonville

Secondary Education

Dennis Michael Frye ---------- Dayton, Ohio
Sandra Anne Gentry ---------- Anderson
Brent Craig Greer ---------- Seneca
Frances Marie Mackey ---------- Bennettsville

Special Education

Catherine Hodge Burgess	Walhalla
Dorothy Barrington Burgess	Clemson
Ellen Turner Burgreen	Anderson
Krista Kathryn Crosby	Clio, Mich.
Marilyn Burnett Foster	Anderson
Nadine Davis Groves	Central
Linda MacGaw Hagen	Anderson
Barbara Ann Lyons	Abbeville
Sallie Pharr	Spring City, Pa.
Erin McJunkin Phillips	West Union
Kathryn Adele Poston	Anderson
Pamela Connor Sloan	Anderson
Carol Denise Still	Chapin
Deborah Marinda Underwood	Anderson

MASTER OF INDUSTRIAL EDUCATION

Roberta Lynn Bauer	Silex, Mo.
Jeffrey Lynn Gossett	Gaffney
Elna Joy Kirven	Hartsville
Anita Shamley Knightner	Anderson
Wanda Talley Staggers	Anderson
Jeffrey Lee Stoudt	Woodbridge, Va.
Sondra Marie Weaver	Sumter
John Fitz Patrick Wetzel	Rabun Gap, Ga.

COLLEGE OF ENGINEERING

MASTER OF ENGINEERING

Civil Engineering

Amer Abdulkader Kamareddine	Tripoli, Lebanon

Electrical Engineering

James Alton Edenfield, Jr.	Lewisville, N. C.
Michael Jay Hayden	Pickerington, Ohio
Charles Pottor Merrill	Danville, N. H.
Donald Alan Schumann	Lisle, Ill.

MASTER OF SCIENCE

Bioengineering

Lisa Clemence Benson	Johnston, R. I.
George Arthur Helmrich	Clemson
Laurel Lynn Rogers	Indianapolis, Ind.

Ceramic Engineering

Dongbin Han	Seoul, Korea
Nitin Ramchandra Lonkar	Pune, India

Chemical Engineering

Robert Charles Hudson	Clemson
Yeong-luan Lin	Toufen, Taiwan
Mark St. John North	Rock Hill

Civil Engineering

Marshall Lee Brown	Anderson
Waseem Jilani	Jackson, Miss.
Satyanarayana Naga Kalidindi	Madras, India

Computer Engineering

Walter Cottingham Henry	Greenville
Simeon Tan Ngo Sy	Manila, Philippines
Zong-Chuang Pan	Feng Shan, Taiwan
Kaleem Syed Shah	Bellary, India
Winston Douglas Wood	Lexington, Ky.

Electrical Engineering

Eric Trent Baskin	Greenville
Wen-Bin Chang	Keelung, Taiwan
Chung Ho Alex Chi	Taipei, Taiwan
Chen-Jen Chiang	Miao-Li, Taiwan
Mohamed Abram Ditall	Ipoh, Malaysia
Patrick Lane Hefley	Simpsonville
Ming Liu	Hsinchu, Taiwan
Shyhchang Liu	Taipei, Taiwan
Lisa Goforth McElveen	Clover
Stanley Jackson Reeves	Abbeville

Industrial Engineering

Omer Sami Yilmaz	Istanbul, Turkey

Mechanical Engineering

Terrence Shu-Shuan Cheng	Taipei, Taiwan
Jeffery Walter Fersner	Orangeburg
Dewitt Austin Latimer	Greenville
Junghsen Lieh	Meinoong, Taiwan
K. Ramamurthi	Coimbatore, India

COLLEGE OF FOREST AND RECREATION RESOURCES

MASTER OF PARKS, RECREATION, AND TOURISM MANAGEMENT

Malcolm Benjamin Fortson ----- Montreat, N. C.
Glenn Scott Withrow ---------- Ellenboro, N. C.

MASTER OF SCIENCE

Forestry

Jeffrey Curtis Bossart ------ Huntington, W. Va.
John William Edwards ---------- Frederick, Md.

Parks, Recreation, and Tourism Management

Susan Marie Alberty --------- Big Rapids, Mich.

COLLEGE OF LIBERAL ARTS

MASTER OF ARTS

English

Dorothy L. McCall ---------------- Greenville
Thomas Edwin Rash ----- Boiling Springs, N. C.
Susan Eleanor Taylor --------------- Anderson
John McRae Turlington ------ Fayetteville, N. C.

History

Judith Lee Bottcher Hoover ---- Reading, Mass.
Tully Hunter ------------------- Morton, Texas

COLLEGE OF NURSING

MASTER OF SCIENCE

Family Health Nursing

Ramona Mitchell Florey ----------- Gordon, Ga.
Domenica Marie Mellinger ------------ Mauldin
Janet Lee Timms ------------------- Anderson
Deborah Freeman Willoughby ---------- Seneca

COLLEGE OF SCIENCES

MASTER OF SCIENCE

Chemistry

Umesh Bhupatrai Goradia ------- Bombay, India
Krishna Sankarankutty Menon ---- Kerala, India
Leigh Phillips ------------------- Warwick, Ga.

Computer Science

Karen MacKinnon McCourt ------------------- Whispering Pines, N. C.
Margaret Anne Mundy -------------- Greenville
Ming Mei Se Ng ----------- Manila, Philippines

Mathematical Sciences

Deborah Lane Berrier ------- Kernersville, N. C.
Eric Bibelnieks ------------------ Spartanburg
Daniel Mark Cromer ---------------- Anderson
Paul Steven Dalberth --------- Rochester, N. Y.
Mary Susan Frank -------------- Louisville, Ky.
David Robinson George III -------------------- Mohegan Lake, N. Y.
Lisa Anne Hudnall ---------------- Vidalia, La.
Alice Kruzel ---------- Broadview Heights, Ohio
Kimberly Dawn McKeever ------ Canisteo, N. Y.
Kelli Michele Munce --------- Winter Park, Fla.
Paul Joseph O'Dea ---------- Big Rapids, Mich.
Craig Michael Turner ---------- Saginaw, Mich.
Elizabeth Jo Valvo ------------- Fredonia, N. Y.

Physics

Matthew John Marone ---------------- Central
Saibal Mitra ------------------ Calcutta, India

Zoology

David Joseph Kazmer ------------- Antioch, Ill.
Susan Marie Lester -------------- Del Mar, Cal.

DOCTORS' DEGREES CONFERRED AUGUST 9, 1986

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY

Applied Economics

Gloria Bromell Tinubu ---------- Plantersville
B.F.A., Howard University; M.S., Clemson University
Dissertation: The Financial Stability of Publicly Owned Water Systems In South Carolina

Entomology

David John Rogers ---------- Queensland, Australia
B.Agr.Sc., M.Agr.Sc., University of Queensland
Dissertation: Interactions Between Pest-Resistant Soybeans and the Beneficial Insects **Geocoris punctipes, Brachymeria ovata,** and **Palexorista laxa**

Nutrition

Shehnaz Gangjee ---------- Madras, India
B.S., M.S., University of Madras
Dissertation: Metabolism of Aflatoxin B_1 by Bovine Lymphocytes **In Vitro**

COLLEGE OF COMMERCE AND INDUSTRY

DOCTOR OF PHILOSOPHY

Industrial Management

Anil Gulati ---------- New Delhi, India
B.Tech., Indian Institute of Technology; M.S., Clemson University
Dissertation: Decision Modeling of Financial Analysts: Tests of Insight Into Their Own Decision Making

Rebecca Blank Porterfield ---------- Marion, Ohio
B.S., M.B.A., Mississippi State University
Dissertation: Joint Venture — A Model for Measuring Strategic Decision Criteria

Alok Srivastava ---------- Hyderabad, India
B.E., Osmania University; M.S., Clemson University
Dissertation: The Roles of Strategic Fit, Profitability, and Risk in Acquisitions

Mahmoud M. Yasin ---------- Jerusalem
B.S., M.S., Clemson University
Dissertation: Assessing Managerial, Technical and Academic Motivation In the Arab Culture: The Relationships of Needs for Achievement, Affiliation and Power with Effectiveness

Management Science

Timothy Hunter Burwell ---------- Spartanburg
B.S., Wofford College; M.S., Clemson University
Dissertation: A Spatially Distributed Queueing Model for Ambulance Systems

COLLEGE OF EDUCATION

DOCTOR OF EDUCATION

Vocational and Technical Education

Robbie Blankenship Hughes ---------- Seneca
B.S., Medical College of Georgia; M.S., Clemson University
Dissertation: The Effect of Modeling Maternal-infant Interactive Behaviors on Lactation Outcomes with Implications for Nursing Education

Marshall William Welch ---------- Williamsburg, Va.
B.S., Francis Marion College; M.In.Ed., Clemson University
Dissertation: Effects of Elevated Noise Levels In the Working Environment on Selected Aspects of Employee Job Satisfaction

COLLEGE OF SCIENCES

DOCTOR OF PHILOSOPHY

Mathematical Sciences

Barry Wayne Peyton .... Clemson
B.A., University of South Florida; M.S., Clemson University
Dissertation: Some Applications of Clique Trees to the Solution of Linear Systems

Daniel William Sharp .... Louisville, Ky.
B.S., University of Louisville; M.S., Clemson University
Dissertation: Generalizations of Hankel and Toeplitz Matrices and Their Associated Interpolation Problems

David Edgar Whited .... Coraopolis, Pa.
B.S., Eckerd College; M.S., Clemson University
Dissertation: Calculation of s-t Reliability in Planar Graphs

BACHELORS' DEGREES CONFERRED DECEMBER 18, 1986

COLLEGE OF AGRICULTURAL SCIENCES

STEPHEN RICHARD CHAPMAN, Acting Dean

BACHELOR OF SCIENCE

Agricultural Economics and Rural Sociology

Melissa Ledford Ables	Westminster
Scott Alan Bly	Ellington, N. Y.
Steven Lawrence McMillan	Lodge

Agricultural Education

*Luke Mario DelPo	Camden
Patricia Marshall Stone	Columbia
Kevin B. Van Romer	Clifton Springs, N. Y.

Agricultural Mechanization and Business

Michael Lanier Crosby	Smoaks
Lewis Wilfred Way III	Orangeburg

Agronomy

Jacob Michael Culler	Orangeburg
Wendell Cecil Furtick	Springfield

Animal Industries

Lisa Michelle Clement	Central
Keeley Clinton Dodd (Degree awarded posthumously)	Charleston
John Christy Langston	Florence
Gary Clark Pait	Hartsville
Andre James Pollard	Greenville
Richard Berner Tingle	Mountville

Economic Biology

Mary Jocelyn Bechly	Hendersonville, N. C.
William Thomas Boling	Myrtle Beach

Horticulture

*Helen A. BeVier	Clemson
Otto Scott Blackwell	Inman
Kenneth Jackson Bowen II	Piedmont
Bonnie Lou Douglas	Middletown, Ohio
Todd Alexander Gillespie	Greenville
**Douglas Jon Gorsline	Greenville
Diana Delores Hassell	Charleston
Betsy Hellman	Laurel, Md.
Rande Allen Lane	Charleston
James Donald Martin	Kershaw
Jonathan Cole Skelton	Clemson
Kevin B. Van Romer	Clifton Springs, N. Y.
Kenda Ruth Woodburn	Tallahassee, Fla.
Jennifer Dee Young	Easley

COLLEGE OF ARCHITECTURE

JAMES FRAZIER BARKER, Dean

BACHELOR OF ARTS

Design

Dawn Kimberly Fleischer	Tecumseh, Mich.
David Harry Parker	Spartanburg

BACHELOR OF SCIENCE

Building Science and Management

Scott Joseph Robertson	Old Bridge, N. J.

Design

**Ireneusz Marian Ciesiolkiewicz	Spartanburg
Matthew Sean Hogan	Spartanburg
Douglas Malcom Horvath	Montique Bay, Alaska
Michael Reid McKenney	North Augusta
Gable DeLorme Stubbs	Mt. Pleasant

BACHELOR OF ARCHITECTURE

Samuel Edwin Holder III	Greenville
Louise Charlotte Sheridan	Isle of Palms

COLLEGE OF COMMERCE AND INDUSTRY

RYAN CUSTER AMACHER, Dean

BACHELOR OF ARTS

Economics

James Walker Coleman IV	Charleston
Teresa Ann Cox	West Pelzer

Double Major
Economics and Spanish

Diane Marie De Lucia — Huntington Station, N. Y.

BACHELOR OF SCIENCE
Accounting

Michael Alan Ansley	Camden
*Melissa Kaye Brigman	Newberry
Kimberly Laine Bush	Columbia
*Melissa Roper Cashman	Anderson
David Walton Dulaney	Walterboro
***Regina Ann Everling	Dallas, Texas
*Julie Ann Landon	North Augusta
*Mary Ellen Macomson	Carnesville, Ga.
John Milton Moore	Piedmont
Donna Ruth Moorehead	Greenwood
William Frederick Ostrye	Silver Spring, Md.
John Matthew Price, Jr.	Parksville
Steven King Stokes	Bethune
Tammy Teresa Thomas	Walterboro
Anita Dale Westbrook	Greenville

Economics

Julia Grace Bishop	Greenville
Charles David Clayton II	Lyman
Martin Ralph Conte	Palm Beach, Fla.
*Eliot Robinson Hardy	Gaithersburg, Md.
Charles Smith Major III	Greenville
Robert Lee Marchant III	Sullivans Island
Walter Scott Millwood	Spartanburg
Gregory Dale Nichols	Anderson
Terry Mark Pait	Hartsville
Bryan DuPont Ramey	Greenville

Financial Management

Kevin Taylor Adams	Loris
Roberta Lynn Alexander	Salem
Amy Letitia Baker	Kershaw
Julie Anne Baker	Sumter
Todd Eugene Barnette	Pendleton
Aaron Keith Batson	Greenville
*Genia DeAnne Carr	Somerville, N. J.
Shawn Arlen Cartmill	Atlanta, Ga.
William Craig Chamblee	Anderson
*Christopher Daniel Davies	Delaware, Ohio
Richard Charles Davis	Charleston
Samuel Carr Doar, Jr.	Landrum
Jon Clark Dohner	Greenville
Nancy Michelle Eades	Liberty
Larry James Fudge	Edgemoor
William Strait Gaston	Rock Hill
Charles Wade Hall	Rock Hill
James Kelvin Hughey	Greenville
Stephen Douglas Jenkins	Spartanburg
Lynette Marie Kanode	Spartanburg
Joseph Neal Keaton	Anderson
Clayton Vance Kerr	Greenville
**Anne Rountree Lipscomb	Toccoa, Ga.
Gerald Lyons	Greenville
Dana Lynn Mann	Central
*Anne Elizabeth Maxwell	Greenville
Gwendolyn McFadden	Lake City
Leslie Ann McKinney	Greenville
*Jamie Lynn McKinnon	Columbia
Victoria Lee Medler	Miami, Fla.
Deborah Lynne Nix	Highlands, N. C.
**Tracey Anne Olcott	Greenville
Darlene Denise Peterson	Johnston
Jeffrey Alton Phillips	Greenville
Suzanne Denise Radford	Lilburn, Ga.
Andrew Alan Rand	Miami, Fla.
Regina Sullivan Rochester	Walhalla
Yvette Morgan Rochester	Townville
*Nancy Simmons-Gehler	Fishkill, N. Y.
Fredrick J. Staudt II	Juno, Fla.
Barry Elliott Teat	Easley
Timothy Donnan Templeton	Rock Hill
Clarence Ross Turner III	Greenville
Laurie Beth Wyrick	Columbia

Industrial Management

Stephen Thomas Ackerman	Decatur, Ga.
Rebecca Lynne Askins	Hartsville
Valerie Dawn Barnett	Columbia
Judith Nan Bevis	Clemson
Michelle Ann Browne	Easley
John Patrick Cecil, Jr.	Spartanburg
Scott Robert Entwisle	Long Valley, N. J.
Julian Howard Falls	Clover
Gregg Owen Goff	Crawfordsville, Ind.
James Eugene Griffin	Simpsonville
John Hewitt Heath II	Atlanta, Ga.
David Lawrance Huber	Randolph, N. J.
Gay Lynn James	Charleston
Gregg Carter Johnson	Spartanburg
John Carvin King	Chesterfield
Eric Walter Kroeber	Harrisonburg, Va.
Michael Paul Lecture	Houston, Texas
Teri Lyn Lundquist	Chattanooga, Tenn.
Bart Monroe Richardson	Landrum
Valerie LaVerne Riley	Goose Creek
Charles David Sanford, Jr.	Candler, N. C.
Steven Bela Sarkady	Rockville, Md.
Kent David Shull	West Columbia
John Derrick Stalvey	Georgetown
Thomas Edward Vibert	Chatham Township, N. J.

Management

George Mike Aboujaoude	Broummana, Lebanon
Edward Moore Alexander	Bishopville
Leslie Carole Bain	Anderson
Cynthia White Baldwin	Piedmont
Lester Lee Barwick	Columbia
Mark Carey Bedenbaugh	Leesville
Ella Diane Black	Clover
Sidney Celeste Breazeale	Greenville
Stephen Coe Brier	Salisbury, N. C.
James Bradley Carlton	Anderson
Elinor Avery Cheney	Clemson
Nansi-Lee Cole	Charlotte, N. C.
Randy Joe Collins (Degree awarded posthumously)	Greenville
Robin Lynn Connell	Atlanta, Ga.
Mary Katherine Costa	Spartanburg
Terry Jane Coward	Belton
Michael Glenn Culbreth	Spartanburg
Richard Mark Davies	Durban, South Africa
Wesley Henry Davis, Jr.	Columbia
Matthew Thomas Dawes	Hendersonville, N. C.
Randall Lewis Ellison	Anderson
Lauren Elizabeth Evans	Augusta, Ga.
Ernest Pendleton Ferguson, Jr.	Winnsboro
Brian Monroe Fields	Spartanburg
Pamela Jo Fisher	Honea Path
Judson Baylus Fleming	Walhalla
Rodney Craig Foster	Greenville
Jonathon Mark Gaddy	Lake View
Brian Phillip Gibbons	Silver Spring, Md.
John Carter Gillis, Jr.	Waycross, Ga.
Frederick Gilmer III	Greenville
Ronald Kirwood Gooding, Jr.	Greenville
Richard Clayton Harris	Greenwood
Anna Maria Harvey	Moncks Corner
John Daniel Harvey	Seneca
***Brian Albert Hermann	Frazer, Pa.
Frank Xavier Hitselberger	Washington, D. C.
Julia Ann Hoffman	Coral Springs, Fla.
Robert Paul Howard, Jr.	Charlotte, N. C.
Richard Mark Hughes	Honea Path
Albert Boyd Jacks	Clinton
Neal Alden Johnson	Florence
Jeffrey Cornwell Jones	Columbia
Jerome Davis Jones	Mauldin
Scott Hemingway Killam	Altamonte Springs, Fla.
Leslie Renee Knox	Hartsville
Elizabeth Whitfield Lambeth	Charlotte, N. C.
James Wayne Landrith	Townville
Maria Buchanan Lockaby	Anderson
Edward Luke Mabry	Orangeburg
Rebecca June Martin	Hemingway
Robert Stanley Merchant	Charleston
Lisa Danielle Mulkey	Orangeburg
Susan Elizabeth Norris	Richmond, Va.
Mary Jacqueline Nye	Poland, Ohio
Andrew Lynn Parker	Spartanburg
Kyle Prescott Pregler	Atlanta, Ga.
Nancy Elaine Rauschenbach	Pickens
Richard Eugene Reames, Jr.	Greenwood
Jennifer Ancella Richardson	St. Vincent, West Indies
Sheree Lemas Robertson	Greensboro, N. C.
Cheryl Whitney Runey	Charleston
Sandra Rebecca Shaw	Atlanta, Ga.
Lisa Dawn Smith	Taylors
Michael Anthony Stokes	Greer
Richard Lawrence Swetonic	Roswell, Ga.
William Scott Vaughn	Travelers Rest
Eddie Wayne Vinson	Union
John Hill Watson	Summerville
William Buist Wells, Jr.	Columbia
Walter Jennings Welsh	Iva
Garry Michael Williams	Fort Lawn
Keith Gerald Wolken	Cincinnati, Ohio
Donna Maria Wood	Tigerville
John Anthony Worthington	Greenville
Jeffrey Scott Wylie	Greenville

Textile Chemistry

Darrell Scott Nasser	Easley

Textile Management

Ruth Livingston Pearce	Myrtle Beach

Textile Science

Julie Marie Adams	Rock Hill

BACHELOR OF TEXTILE TECHNOLOGY

John Patrick Charleston	Granite Quarry, N. C.
Leland Smith Griffin	Easley
Rhonda Faye Holland	West Union

COLLEGE OF EDUCATION

JAMES EDWARD MATTHEWS, Dean

BACHELOR OF ARTS

Early Childhood Education

**Kristi Woods Adams	Piedmont
Pamela Joyce Carver	Seneca
Margaret Carole Dunlap	Rock Hill
Cecelia Anne Facelli	Rock Hill
*Crystal Renee Fickling	Rock Hill
Robin Alane Freeman	Georgetown
Kathryn Joyce Gilchrist	Charleston
***Judy Paula Gillespie	Easley
Kathryn Marie Hagood	Pickens
Tamarha Cean Huggins	Greenville
JoEllen Tuttle Wannamaker	St. Matthews
Cynthia Lynne West	Camden
Suzanne Whitlaw	Jackson

Elementary Education

Beverly Patricia Baxley	Hemingway
Elaine Moody Breedlove	West Union
Carol Ann Camburn	Ocean City, N. J.
Kimberly Lynn Clark	Liberty
Susan Anne Funderburk	Greenville
*Kimberly Jo Gregory	Greenville
Marena John Lambrou	Greenville
James Todd Long	Anderson
Terry Dale Meekins	Lake View
Kathy Lynn Prevost	Easley
Judy Rochester Quarles	Seneca
*Dana Rhoden Todd	Greenville
Tracy Leigh Tribble	Charleston
Sandra Dee Williams	Pickens
Elizabeth Paige Willimon	Westminster

Secondary Education

Elizabeth Ann Atwood	Greenville
Neil Joseph Brophy	Hilton Head Island
Martha Sue Brothers	Pendleton
Ann Margaret Chastain	Pendleton
Lydia Ann Cureton	Columbia
*Sherri Munn Helton	Florence
Lillian Elaine Hyatt	Salem
Kathryn Pauline King	Bishopville
Brian Scott Martin	Powder Springs, Ga.
*Janet Lynn Roberts	Anderson
Todd Lee Schonhar	Easley
Sherry Renee Shipes	Williston
***Jane Little Stephens	Aiken
Kimberly Ann Utley	Charlotte, N. C.
Andra Sue Walker	Anderson
*Melissa Louise Walls	Blue Ridge
Gene Edward Williams	Mullins
Veronica Marie Wood	Pickens

BACHELOR OF SCIENCE

Graphic Communications

Joseph Michael Barrett	Chapin
Melissa Faye Bridges	Greenville
Mary Helen Huber	Greensboro, N. C.
Roy Monroe Irwin III	Greensboro, N. C.
Linda Susan McCarthy	Aiken

Industrial Education

Glendon Robertson Brickley	Saluda
Jonathan Myers Campbell	Clemson
Jerry Dean Herman	Wise, Va.
Robert Willard Higby	Clemson
Alexander Xavier Holloman	Myrtle Beach
Ryan McDaniel James	Cliffside, N. C.
Jeffrey Glen Kelley	Norris
Ewell Jefferson Lytton	Cincinnati, Ohio
Michael David McMahon	Dalton, Ga.
John Squyres Olive	Clemson
Edwin Raynard Richardson	Thomasville, N. C.

Science Teaching

James Thomas Allen	Ardsley, N. Y.
Stephanie Dian Brown	Clemson
Benjamin Greg Budka	Ephrata, Wash.
Toni Lynn Garner	Greenville
Carla Arthur Keasler	Fair Play
Lana Yvonne Ledford	Easley
***Catherine Callahan McPherson	Anderson

COLLEGE OF ENGINEERING

JOSEPH CHARLES JENNETT, Dean

BACHELOR OF SCIENCE

Agricultural Engineering

(Agricultural Engineering is jointly administered by the College of Agricultural Sciences and the College of Engineering.)

Dennis Michael Greene	Greenville
William T. Harley	Trenton
Calvin David Koon	Irmo

Ceramic Engineering

Gabriele Gruss	Arden, N. C.
Tracy Howard Ivester	Anderson
Eugene Scott Marlar	Simpsonville
Matson Glen Tramel	Oak Ridge, Tenn.

Chemical Engineering

David Augustus Basil	Columbia
John David Halm	Jacksonville, Fla.
James Bagwell Merck	Piedmont
Christopher Edward Niemeyer	Gaithersburg, Md.

Civil Engineering

Scott Steven Baldwin	Mishawaka, Ind.
Jose Alejandro Benitez	Maturin, Venezuela
Paula Willard Boelke	Rockville, Md.
Joseph Neil Bolen, Jr.	Pickens
Daniel Charles Botdorf	Seaford, Del.
Curtis Lane Burgess	Pickens
Anthony Paul Caraviello	Goose Creek
Roger Brian Carroll	Greenville
Oscar Samuel Catoe III	Lancaster
Stephen Joseph Datz	Mullica Hill, N. J.
Arthur Jenkins Dwight	Sumter
Kenneth Earl Fennell	Greenwood
Farris Carlos Hill	Ninety Six
*Kirsten Jaye Holland	Nashville, Tenn.
Christopher Neal Hollis	Greenville
Milledge Jefferies Holstein, Jr.	Orangeburg
*Brett Michael Ingram	Northfield, N. J.
*Carla Jones	North Augusta
Theodore George Light	Nashville, Tenn.
Cynthia Louise Lytle	Seneca
Arthur Scott McAlister	Greenwood
John Howard Murphree	Myrtle Beach
Michael Anthony O'Cain	Orangeburg
Richard Albert Pope	Hemingway
Mary Rochelle Pyron	Seneca
Robert Gregory Schmelzer	Columbia
Robert Ryland Thompson	Wise, Va.
John Stephen Traylor	Greenville
James Everett Triplett	Chester
Charles Patrick Tyler	Columbia
Mark Hall Walton	West Palm Beach, Fla.
William Jeffery Wells	Coumbia
Gregory Howard Williams	Greenville

Computer Engineering

George Byars Anderson, Jr.	Rock Hill
Scott Mauldin Anderson	Greenwood
*Thomas Andrew Beard	Clemson
***Andrew Wayne Beardslee	Campbell, N. Y.
Daniel Braxton Berry II	St. George
Susan Lynne Boiter	Laurens
Sherri Arlene Crayton	Belton
William Howard Dover	Westminster
John Barry Foore	Charleston
Richard Thomas Forrest	Columbia
Gidget Denetra Hall	Simpsonville
Geofferey Kristopher Harrison	Greenville
Lundy Stafford Hill	Hendersonville, N. C.
Jeffrey Scott Jacobs	West Columbia
William Harold Justice, Jr.	Sidney, Australia
Janice Ann Kilgore	Greenwood
Douglas D. Lee	Charleston
Johnny Tienyi Li	Summerville
Todd Charles Marek	Vestavia Hills, Ala.
*Douglas Cline Martin	Greer
David Edward McLeod	Atlantic City, N. J.
*James Richard McVey, Jr.	Florence
Uday O. Pabral	New Delhi, India
*Debra Lynn Parrott	Panama City, Fla.
Stephen Brian Posey	New Holland
Donna Rae Roberts	Georgetown
Stephen Bruce Rogers	Manchester, Mo.
Suzanne Sarah Sexton	Easley
Vijay K. Shah	Umreth, India
Susan Martha Stamey	Brevard, N. C.
Joseph Cole Swift, Jr.	Virginia Beach, Va.
Michael Scott Tollison	Anderson

Electrical Engineering

John Brad Bagwell	Eutawville
†**James Cavelle Batchelor, Jr.	Greenville
James R. Bercik	Spartanburg
Bryan Allen Blanton	Gaffney
James Alan Bost	Clemson
Jeannine Elizabeth Bulce	Gaffney
Richard Loyal Burton	Simpsonville
Mark Ferguson Byerley	Walhalla
David James Carney	Lincroft, N. J.
Thomas Ricks Clark	Lexington
Eugene Lawton Craft	Orangeburg
*Kevin Robert DeVries	Raleigh, N. C.
Stephen Russell Drake	Clemson
Jeffrey Scott Edney	Landrum
Phillip Wyler Evans	Anderson
Myra Anne Ezell	Spartanburg
David Louis Fennington	Central
Kenneth Charles Fertig	North Charleston
Robert Mack Ford, Jr.	Greenville
Brian Arlington Gambrell	Anderson
Ibrahim Handaja	Bandung, Indonesia
Stephen Lawrence Harvey	Clemson
John Eulis Lawton, Jr.	Greenwood
Laura Lee	Wooster, Ohio
Forrest Page Lupo	Charlotte, N. C.
Joseph Lee McAbee	Gilbert
Justin Reeves McMillan	Allendale
*Andrew David Paff	Tryon, N. C.
Duane John Palumbo	Forked River, N. J.
Pradeep Babubhai Patel	Atlanta, Ga.
Robert Alan Pirson	Orlando, Fla.
Todd Dean Plucknette	Spencerport, N. Y.
Ramin Pourmand	Tehran, Iran
*Timothy Todd Pruitt	Spartanburg
Mickey Brian Simpson	Westminster
Tracy Lynn Stoner	Goose Creek
Duane Carl Strickland	Niceville, Fla.
Charles Bruce Strother	Graniteville
*Barry Croel Sudduth	Duncan
*Patricia Ann Summers	Rock Hill
**Rebekah Lynne Thompson	Lancaster
David Pinckney Wagers	St. George
William Robert Watts, Jr.	Union
Daniel Thomas White	Somers, Mont.
†***Mark Cannon Whiteside	Melbourne, Fla.

Engineering Analysis

Veronica Gail Parker ---------- Charleston

Engineering Technology

Samuel Stanley Ashley, Jr. ---------- Belton
Roger Darrell Baucom ---------- Lawrinburg, N. C.
Barbara Elaine Brantley ---------- Spartanburg
Chandra Yvonne Daniel ---------- Greenville
James Ross Dukes ---------- Columbia
Lindsey Philip Elrod, Jr. ---------- Greenville
Marc Frederick Fiori ---------- Pemberton, N. J.
Daniel Seth Gilden ---------- Aiken
Jonathan Dale Kearse ---------- Fairfax
Paul David Kellett ---------- Fountain Inn
Robert Paul Klepper ---------- Arden, N. C.
Mack Edward McCarter ---------- Clover
Thomas Joseph McDonough ---------- Old Bethage, N. Y.
Richard Stephen Moore ---------- Simpsonville
Stephen Tyler Patton ---------- Woodruff
Jan Manfred Seidl ---------- Greer
Tapp Blaine Skinner ---------- Greer
Kyle Palmer Tatum ---------- Aiken
Timothy Allen Turk ---------- Townville
Kenneth Dale Wyndham ---------- Fort Mill

Industrial Engineering

Michael Gregory Bush ---------- Guaynabo, Puerto Rico
*Thomas Remington Chewning III ---------- Harrisburg, Pa.
Donna Ann Davis ---------- Spartanburg
Douglas Norman Fowler II ---------- Mauldin
Duncan Frazier Patterson ---------- North Augusta
Elizabeth Marie Raubolt ---------- Greer
Michael Christopher Sowa ---------- Wethersfield, Ct.

Mechanical Engineering

**Charles Jeffrey Adkins ---------- Inverness, Fla.
Thomas Simpson Agnew ---------- Piedmont
Eric Frank Alter ---------- Easley
Charles David Anderson ---------- Rock Hill
William Henry Apple ---------- Cincinnati, Ohio
Michael Francis Baier ---------- Spartanburg
David Bruce Baxley ---------- Aynor
Stephen Thompson Bennett ---------- Greenville
**Clay Herndon Boyd ---------- Rock Hill
Gregory Allen Burrell ---------- Walhalla
Marvin Reese Cann ---------- Lynchburg, Va.
Andrew Stokes Covington ---------- Taylors
Marco Antonio De Maria ---------- Greenville
Stephen Fred Dunham ---------- Beckley, W. Va.
John Alexander Dunn III ---------- Charleston
Richard Andrew Farmer ---------- Hanahan
David Wilson Ferguson ---------- Greenville
Tod Edward Flathmann ---------- Charleston
Christyn Breen Fleming ---------- Ocala, Fla.
Andrew John Fookes ---------- Pawleys Island
Jonathan Thomas Ford, Jr. ---------- Frederick, Md.
Duane Martin Hawkins ---------- Spartanburg
*David Barry Heifetz ---------- Rockville, Md.
Steven Edward Hendrix ---------- Stone Mountain, Ga.
John William Hixon ---------- La Vale, Md.
Bret Emerson Hursey ---------- Greenville
Gregory Herman Jackson ---------- Clinton
Waymon Mitchell Knox ---------- Easley
Thomas Paul Lewandowski ---------- Lewiston, N. Y.
Gary Dean McDaris ---------- Taylors
Ross Alan McRoy ---------- Summerville
Christian Fredez Militzer ---------- Summerville
James Matthew Miskell ---------- Jacksonville, Fla.
Matthew Stephen Munter ---------- Rockville, Md.
James Donald Rice, Jr. ---------- Macon, Ga.
Kimberly Faith Shealy ---------- Shelby, N. C.
*George Agnew Stone, Jr. ---------- Columbia
Thomas Martin Sullivan ---------- Greenville
Kellie Marie Taube ---------- Lake Orion, Mich.
Benjamin Glenn Teachey ---------- Greenville
Thomas Kent Thompson ---------- Renfrew, Pa.
David Liam Tynan ---------- Easley
Edward Lorain Welsh, Jr. ---------- Mt. Pleasant

COLLEGE OF FOREST AND RECREATION RESOURCES

HERBERT BRANTLEY, Acting Dean

BACHELOR OF SCIENCE

Parks, Recreation, and Tourism Management

James Richard Buckley ---------- Greenville
Gregory Esgro ---------- Pitman, N. J.
Alan Eugene Jeffers ---------- York, Pa.
Darlene Yvonne Kelley ---------- Wedgefield
Jeffery Austin Kerr ---------- Casselbury, Fla.
Katherine Lynn Kingman ---------- Clemson
Teresa Lynn Kugler ---------- Columbia
Rhonda Wilson Martin ---------- Jacksonville, Fla.
Maria Charmaine McSwain ---------- Salem
Helen Austin Reel ---------- Clemson
Eric Conrad Rodgers ---------- Clemson
Elizabeth Lenore Schoen ---------- Galivants Ferry
Suanne Stuart Seaborn ---------- Greenville
Leslie Anne Stebbins ---------- Atlanta, Ga.
Nancy Lynn Wellish ---------- Stirling, N. J.
Janney Zonnevylle ---------- Spring Lake Heights, N. J.

Wood Utilization

William Charles Kirkpatrick, Jr. ---------- Manasquan, N. J.
Thomas Gary Reke ---------- Bristol, Tenn.

COLLEGE OF LIBERAL ARTS

ROBERT ALFRED WALLER, Dean

BACHELOR OF ARTS

English

Lenora Jane Adkins	York
**Herbert N. Bagshaw	Salem
Elizabeth Hunter Beckham	Greenville
*Linda Christoph Bertel	Seneca
Jeffrey Scott Butler	Virginia Beach, Va.
**Julie Anne Ellington	Pendleton
Maria Karen Kolba	Chatham, N. J.
Steven Frederic Lee	Camden
Mary Anna Wood Whitmire	Seneca
Kelly Lauren Winters	Palm Beach Gardens, Fla.

History

Thomas David Apter	Mt. Pleasant
*Regina Parvin Crawford	Central
*Angela Smith	Athens, Ga.

Modern Languages

David Marshall Hamilton	Clemson
Arden Haywood	Charleston
*Helena Elisabet Pelfrey	Stockholm, Sweden

Political Science

David Sims Bonner	Charleston
David Cary Daubenspeck	Hilton Head Island
Stacey Denise Haynes	Six Mile
John David Madden	Anderson
Rebecca Lynn Snellings	Manassas, Va.
Douglas Dragan Stalnaker	Guthrie, Okla.
Jon Barry Tomlinson	Scranton

Psychology

Robin Justine Berry	Charleston
Meg Harris Bryce	Florence
Steven Kenneth Collins	Charleston
Lauren Marie Jackson	Shelby, N. C.
Brian Eugene O'Connor	Seneca
Sandra Jane Pierson	Pittsburgh, Pa.
Kimberley Wood Smith	Taylors
Susan Bradham Smith	Bishopville
Michele Marie Snyder	Charleston
Sara Gadsden Vardell	Charleston
Rebecca Wyant	Spartanburg

Sociology

Kimberly Cannon Gibson	Bristol, Tenn.

Double Major

Economics and Political Science

Dwayne Edward Campbell	Florence

COLLEGE OF NURSING

MARY MARGARET LOHR, Dean

BACHELOR OF SCIENCE

Nursing

Catherine Denise Adams	Charleston
Margaret Jane Agnew	Orangeburg
**Christine Elizabeth Beck	Winter Park, Fla.
Maria Ruth Davis	Orangeburg
Janice Bonita Dye	Columbia
Elizabeth Anne Ellington	Charlotte, N. C.
Catherine Lenora Fletcher	Georgetown
Rose Margaret Gombar	Baltimore, Md.
Annegret Grube	Clemson
Tibby Katrina Kemmerlin	Orangeburg
Lora Frances Neely	Pelzer
Sara Agnes Stewart	Winnsboro
Camala Watson Underhill	Pickens
Joyce Barrett Waggoner	Florence

COLLEGE OF SCIENCES

HENRY ELLIOTT VOGEL, Dean

BACHELOR OF ARTS

Geology

Andrew Ross Harrison	Richmond, Va.

Mathematical Sciences

Ada Lynne Fyans	Greenville

BACHELOR OF SCIENCE

Biochemistry

Samuel Wingard Bookhart III	Chadds Ford, Pa.
Bennie Hill Brickle III	Orangeburg

Chemistry

Jeffery Allan Melsom	Greenville
Michael Todd Scott	Williston

Computer Information Systems

Claudia Elizabeth Ambler	Boca Raton, Fla.
Sylvia DeAnne Bryan	Indialantic, Fla.
Peter George Bylenga	Greenville
Lynne Butler Cuttino	Easley
Lynette Suzanne Dillow	North Augusta
John Wade Mixson	Stone Mountain, Ga.
Todd Glenn Nash	Weston, Ct.
Douglas Wayne Sample	Belvedere
Glover Byram Sewell III	Newnan, Ga.
Joseph Smith Vickery	Simpsonville

Computer Science

Gregory Dale Bishop	Clemson
Krystal Lynn Bolt	Anderson
Margaret Caroline Brown	Marianna, Fla.
Randolph Leonard Bunton, Jr.	Columbia
Marc Francis Hayes, Jr.	Atlanta, Ga.
Shannon Douglas Ketchie	Macon, Ga.
Charles Edward McAtee, Jr.	Greenwood
*Wendell Lee Meeks	Spartanburg
Kyle Eugene Merrigan	Marietta, Ga.
Wilson Lee Neumann	Gastonia, N. C.
Weng Onn Ng	Kuala Lumpur, Malaysia
Tracey Lea Ouzts	Greenwood
Kevin Eugene Sharrett	Summerville
Margaret Allison Smith	Holly Hill
John Bradley Whiteside	Rock Hill
Franklin DeWitt Wyatt	Williamston

Geology

Richard David Asti	Anderson

Mathematical Sciences

Ashwin Arora	Clemson
*Lauren Kathleen Benson	Calgary, Alberta, Canada
Amy Lou Boyles	Belleville, Ill.
David Gene Ferguson	Anderson
Kimberly Stowe Fowler	Charleston
Kathryn Jonnelle Hayden	Orangeburg
James Abraham Houck III	Jacksonville, Fla.
Viola Nannette Lee	Buffalo, N. Y.
Deirdre Elizabeth Mackinson	Van Wyck
Melissa Thedora McCollum	Easley
Margaret Elizabeth Saboe	Charleston
Ann Sanders Templeton	Spartanburg
James William Thomason, Jr.	Greenville
Anita Shirese White	Ninety Six
Thomas Randolph Yeargin	Laurens

Medical Technology

Kelly Gene Berry	Piedmont
Karan Annette Helms	Fort Mill

Microbiology

Carol Lynne Bagwell	Jacksonville, Fla.
Paula Elaine Britton	Simpsonville
Kenneth Verdelis Ford	Charleston
Kenneth Gerald Mattison	Piedmont
Thomas Albert McDonald	Hartsville
Kathy Deneen Patterson	Columbia
Deatrice Renette Williams	Goose Creek

Pre-Professional Studies

**Brant Todd Heniford	Loris
James Paul Phillips	Columbia

Zoology

Michael Glenn Barron	Columbia
Timothy Roger Brown	Greenville
Jones Woodrow Bryan, Jr.	Fairfax
Michael Brett Byerly	Fayetteville, Ga.
Steven Charles Davis	Spartanburg
Catherine Elizabeth Langston	Lyman
Kelly Lynn Lazarus	PottsGrove, Pa.
Paula Smith Scott	Easley
Brian James Wisnewski	North Augusta

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*Cum laude: A grade point ratio of 3.40 to 3.69

**Magna cum laude: A grade point ratio of 3.70 to 3.89

***Summa cum laude: A grade point ratio of 3.90 to 4.00

†Senior Departmental Honors: The students so designated have earned a B or better in the six to twelve credits of honors work at the upper division level in a program designed by their department. They have maintained a minimum GPR overall of 3.40. They appear in the line of march with an honors medallion on an orange and purple ribbon.

EDUCATION SPECIALIST AND MASTERS' DEGREES CONFERRED DECEMBER 18, 1986

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

MASTER OF AGRICULTURAL EDUCATION

John Robert Crawford ---------- Saluda
Clinton Daniel Henderson, Jr. ---------- Saluda
William J. Hendrix ---------- Laurens

MASTER OF AGRICULTURE

Charles William Burgess II ---------- Marietta, Ga.
Alexander Mctaggart Sprott, Jr. ---------- Florence
Joe Edward Varn, Jr. ---------- Greenville
Larry Blaine Williamson ---------- Manning

MASTER OF NUTRITIONAL SCIENCES

Rachael Elizabeth Davis ---------- LaGrange, Ga.
Cheryl Lynne Rudd ---------- Leasburg, N. C.

MASTER OF SCIENCE

Agricultural Economics

Stephen Paul Slice ---------- Anderson

Agronomy

William Edward Haigler ---------- Cameron
Renee Joan Keese ---------- Easley

Animal and Food Industries

Jeri Lynn McArthur ---------- Rock Hill
Kerry Elizabeth Robinson ---------- Dunfermline, Scotland
Wesley Charles Warren ---------- West Palm Beach, Fla.

Horticulture

Kathie Edson Kalmowitz ---------- Tucson, Ariz.

Nutrition

Valerie Lane McCallum ---------- Huntington, W. Va.

COLLEGE OF ARCHITECTURE

MASTER OF ARCHITECTURE

William Wyatt Branham ---------- Charlotte, N. C.
Willoughby Greer Cheney III ---------- Clemson
Margaret Elizabeth Gibson ---------- Fort Walton Beach, Fla.
Reginald Lee Gibson ---------- Anderson
Timothy Lee Maguire ---------- Atlanta, Ga.
Benton Lee Rudolph ---------- Clemson
David Scott Seibert ---------- Toms River, N. J.
Gilliland Leonard Stewart ---------- Pickens
Nicholas Dimitri Trakas ---------- Spartanburg
Carla Jean Wortkoetter ---------- Greenville

MASTER OF CITY AND REGIONAL PLANNING

Robert Witherspoon Ervin ---------- Florence
Lisa Ann Horne ---------- Cayce

MASTER OF FINE ARTS

Phyllis Ann Marisa Barnard ---------- Aiken
Susan Jen Polk ---------- Ft. Lauderdale, Fla.
Christopher Leonard Wallace ---------- Rock Hill

COLLEGE OF COMMERCE AND INDUSTRY

MASTER OF BUSINESS ADMINISTRATION

Jackie Melissa Bolt ---------- Greenville
Ronald Vincent Carpin ---------- Greenville
William Talmadge Coffey ---------- Greenville
William Phillips Devlin ---------- Greenville
Emily Knight Giola ---------- Greenville
Marion Rembelski Grier ---------- Detroit, Mich.
Thomas Eugene Griffin ---------- Piedmont
Cathy Marie Harvey ---------- Roanoke, Va.
Marilyn M. Haugen ---------- Moccasin, Mont.
Steven James McIntosh ---------- Hendersonville, N. C.
Charles Webster McSorley ---------- Spartanburg
Frederick Lee Rickabaugh ---------- Greer
Karen Elizabeth Turner ---------- Greenville
John Edward Wightman III ---------- Greenville

MASTER OF PROFESSIONAL ACCOUNTANCY

Cynthia Ann Morris	Beaufort
James Richard Rouse	Fountain Inn
Barbara Jean Stefan	Greenville
Lilly Arlene Teague	Ware Shoals

MASTER OF ARTS

Economics

Leslie Kay Foster	Clemson
Gi Ryong Jung	Pusan, Korea
Sheryl Jeanne LaSure	Cortland, N. Y.
Richard Warren Meyer	Clemson

MASTER OF SCIENCE

Industrial Management

Rick James Conte	Ft. Lauderdale, Fla.
Robin Marie Conte	Ft. Lauderdale, Fla.
Jeffrey Paddison Cook	Clemmons, N. C.
Raymond Heston Hicks	Tampa, Fla.
Hossein Jamshidi	Clemson
Sukran Nilvana Kadipasaoglu	Istanbul, Turkey
Claire Linda Manning	Charleston
Fabian Kafuko Nabangi	Namadope, Uganda
Alan Mark Wertz	Charleston
Kwansz Terry Yang	Taichung, Taiwan

Textile Science

Thomas David Bayha	Charlotte, N. C.

COLLEGE OF EDUCATION

EDUCATION SPECIALIST

Administration and Supervision

Charles Edwin Kennedy	West Union
Wililam Rallie Liston	Laurens
Willard Ernest Morris	Hartwell, Ga.
Anne Ponder Rauton	Clemson

MASTER OF EDUCATION

Administration and Supervision

Cynthia Drawdy Davis	Greenville
Mark Parkins Hood	Greenville
Sheryl Dennise Lewis	Greenville
Cynthia Oxford	Anderson
Leonard Allen Williams	Liberty
Mark Dana Wilson	Greer

Counseling and Guidance Services

Jane Abbott-Scherz	Greenville
Beverly Gaymon Ashemore	Manning
Susan Moore Breazeale	Louisville, Ky.
Mattie Flowers Burke	Detroit, Mich.
Sheron Jones Davis	Anderson
Deborah Green Ervin	Seneca
Jean Wilson Harris	Greenville
Maripat Sentelle Herring	Easley
Glenda Scott Kennedy	Columbia
Susan J. S. Lasser	Silver Spring, Md.
Wesley Bazil Lothery, Jr.	Fair Play
Elaine Welch McCallum	Anderson
Ruffin Horne McNeill, Jr.	Lumberton, N. C.
Yvonne Holliday Miller	Seneca
Tessa Teague Moore	Greenwood
Mary Claire Rose	Charleston
Richard Michael Rose	Lexington, Ky.
Ruth I. Slann	Clemson
Betty Warren Thacker	Newberry
Kathy Walden Underwood	Greenwood
Betty Tarrant Vaughn	Greenville

Elementary Education

Phyllis Burns Byrd	Toccoa, Ga.
Brenda Devore Campbell	Donalds
Sheila Simmons Dunn	Pickens
Judy Wilson Evans	Starr
Rose Collins Harris	Greenville
Pamela Gilmer Wright	Anderson
Karen Renee Yuki	Greenville

Reading

Sabrina Vail Carter	Clemson
Melanie Bowen Kennedy	Donalds
Harriette Louisa Mackey	Williamston

Secondary Education

Chichi Harris Herr	Clemson
Corinne Sitton Williams	Easley

Special Education

Donald Raymond Morgan	Anderson
June Marie Palmer	Greenville
Barbara Perry Parks	Rock Hill
Donna Murphy Seigle	Fair Play

MASTER OF INDUSTRIAL EDUCATION

Stanley Bernard Bishop	Spartanburg
Tracy Elaine Bryant	Walhalla
Terry Lee Corder	Liberty
James Ray McMakin	Lyman
Kevin Wayne Vivian	Gander, Newfoundland

COLLEGE OF ENGINEERING

MASTER OF ENGINEERING

Chemical Engineering

Daniel Taylor McBride	Chesnee

Civil Engineering

David Edward Scott	Sumter

Environmental Systems Engineering

Michael Robert D'Alessandro	Atlanta, Ga.
Raymond Edwin Lees, Jr.	Philadelphia, Pa.
Li-Fen Shih	Taichung, Taiwan

MASTER OF SCIENCE

Bioengineering

Sharon Fay Chatmond	Louisville, Ky.
Mary Ellen Davenport	Deland, Fla.
Robert Leedham Fike	Midland, Mich.
Sunil Kumar Gupta	Hyderabad, India
Susan Marie Lang	Warren, Mich.
Richard Allen Malinauskas	Oak Ridge, Tenn.

Ceramic Engineering

John Wells Cogburn	Columbus, Ind.

Civil Engineering

Michael Emerson Cribb	Florence
Patrick Michael Fourspring	Erie, Pa.
Vidyadhar Kulkarni	Bangalore, India
Leslie Mitchell Wegierek	Simpsonville
Bob Lee Whitfield	Salem

Computer Engineering

Jesse I. Adams III	Charleston
Hakan Sven Thyr	Uppsala, Sweden

Electrical Engineering

Lai Kuen Chan	Singapore
David Tien Jen Li	Summerville
Steven Harper Little	Greenville
Douglas Tyree Littlefield	Abbeville
William Palmer Lovegrove	Idaho Falls, Idaho
Wyin-Pyin Lyui	Taichung, Taiwan
Thomas Stuart Taylor	Pendleton
Chihchiang Tsai	Clemson
Tzyming Wang	Taipei, Taiwan
Whei-Ping Yeh	Clemson

Environmental Systems Engineering

James Ralph Aldrich	Minneapolis, Minn.

Industrial Engineering

Jay Andrew Blessing	Easley
Chris Kevin Graver	Orwigsburg, Pa.

Mechanical Engineering

Morris Brian Bowers	Heath Springs
Shui-Hang Chou	Detroit, Mich.
Rajan George	Madras, India
Vernon Eric Jackson	Ann Arbor, Mich.
Michael Joseph O'Melia	Smithfield, N. C.
Sanjay Prakash	New Delhi, India
Shekhar Karamchand Sharma	Srinagar, India
Stephen Elliott Suggs	Columbia
Eric John Torgerson	Raleigh, N. C.
David Thomas Villarosa, Jr.	Summerville

COLLEGE OF FOREST AND RECREATION RESOURCES

MASTER OF PARKS, RECREATION, AND TOURISM MANAGEMENT

Kimberly Willis Stroud	Columbia

MASTER OF SCIENCE

Parks, Recreation, and Tourism Management

Myron Fran Floyd	Loris
Susan Manes	Greensboro, N. C.

COLLEGE OF LIBERAL ARTS

MASTER OF ARTS

English

Leigh Barbara Berman	Clemson
Dianna Paige Blackwell	Columbia
Mary Elisabeth Dendy	Anderson

History

Johannes Cornelis Koeleman	Uithoorn, The Netherlands

COLLEGE OF NURSING

MASTER OF SCIENCE

Family Health Nursing

Jean Park Brown	Travelers Rest
Susan Park Kyzer	Travelers Rest

COLLEGE OF SCIENCES

MASTER OF SCIENCE

Biochemistry

Ji Qin	Shanghai, China

Chemistry

Jaang-Ju Iris Chyan	Taichung, Taiwan
Agbor-Ndiparrey Egbewatt	Alexandria, Va.
Andrea Wolfe Wallace	Chattanooga, Tenn.

Computer Science

Mark Todd Harris	Boone, N. C.
Hubert Brantley Hickman	Castor, La.
Philip DeWayne Lyles	Easley
Eva Lois Pittard	Simpsonville
Thomas David Rivers	Williston
Brian Keith Smith	Louisville, Ga.

Mathematical Sciences

Kathryn Diane Bisack	Southport, Ct.
Naozer Dara Dadachanji	Bombay, India
Lisa Renee Dekle	Jacksonville, Fla.
Glen Michael Knott	Thibodaux, La.
Dean Patrick Moore	Houma, La.
Peter MacDougall Nylen	Deland, Fla.

Microbiology

Michelle McKay Fleming	Fairfield, Ohio
LuAnn Lynn Jillson Gerber	Lincoln, Neb.

DOCTORS' DEGREES CONFERRED DECEMBER 18, 1986

ARNOLD EDWARD SCHWARTZ, Dean, Graduate School

COLLEGE OF AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY

Animal Physiology

Mary Elaine Richardson ---------- Clemson
B.S., Memphis State University; M.S., Clemson University
Dissertation: Characterization of Acrosin from the Spermatozoa of the Domestic Turkey, **Meleagris gallopavo**

Entomology

Jeffrey Richard Brushwein ---------- Portland, Maine
B.S., M.S., University of Maine at Orono
Dissertation: Bionomics of **Mantispa viridis** Walker (Neuroptera: Mantispidae)

Steven Wayne Hamilton ---------- Hammondsport, N. Y.
B.S., State University College, Geneseo, N. Y.; M.A., University of Kansas
Dissertation: Systematics and Biogeography of New World **Polycentropus sensu stricto** (Trichoptera: Polycentropodidae)

Nutrition

Christina Sue Winstead ---------- Ithaca, N. Y.
B.S.A., M.S., University of Arkansas
Dissertation: Regulation of Energy Balance in Broilers Following Elevation in Body Fat Induced by Force-Feeding

COLLEGE OF COMMERCE AND INDUSTRY

DOCTOR OF PHILOSOPHY

Industrial Management

Van George Haven Clouse ---------- Drayton
B.A., Wofford College; M.S., Clemson University
Dissertation: New Venture Creation — A Decision Based Approach to Entrepreneurial Activity

Ronald Floyd Green ---------- McClellanville
B.S., Clemson University; M.P.A., M.B.A., Jacksonville State University
Dissertation: Competitive Bidding Processes: An Empirical Investigation of Strategic Orientation and Performance

Emre Ali Veral ---------- Istanbul, Turkey
B.S., University of Missouri, Columbia; M.S., Clemson University
Dissertation: Integrating the Master Production Scheduling and Bills of Material Explosion Functions in Material Requirements Planning Systems

Marwan Abdelqader Wafa ---------- Kuwait, Jaffa, Kuwait
B.S., Kuwait University; M.S., Clemson University
Dissertation: An Investigation into the Factors Influencing the Success of Decision Support Systems in the Construction Industry

COLLEGE OF ENGINEERING

DOCTOR OF PHILOSOPHY

Engineering

Stanley Carlton Ahalt ---------- Blacksburg, Va.
B.S., M.S., Virginia Polytechnic Institute
Dissertation: Parser-based Retargetable Code Generation Using High-level, Tree-structured Intermediate Representations (Field of Specialization: Electrical Engineering)

Rajiv Vishnudutt Dubey — Bombay, India
B. Tech.; Indian Institute of Technology; M.S., Clemson University
Dissertation: Analysis and Control of Redundant Robots (Field of Specialization: Mechanical Engineering)

Mohammad-Ali Jamnia — Tehran, Iran
B.S., Ohio State University; M.S., Clemson University
Dissertation: A Finite Element Procedure for Hydrodynamic Shock Wave Propagation and Reflection (Field of Specialization: Engineering Mechanics)

William David Nicholas — Clemson
B.S., University of North Carolina; M.S., Clemson University
Dissertation: Periodic Responses of Aquatic Microecosystems to Toxicant Stress (Field of Specialization: Environmental Systems Engineering)

John Dardis Simmons — Clemson
B.S., M.S., University of Tennessee
Dissertation: Computer Simulation of an Alternate Energy Based, High-Density Brooding Facility (Field of Specialization: Agricultural Engineering)

Enar Ahmet Tunc — Istanbul, Turkey
B.S., Bogazici University; M.S., Clemson University
Dissertation: Production and Workforce Planning in Long Cycle Product Environments (Field of Specialization: Industrial Engineering)

COLLEGE OF FOREST AND RECREATION RESOURCES

DOCTOR OF PHILOSOPHY

Forestry

Robert Kent Reid — Whitakers, N. C.
B.S., North Carolina State University; M.S., Colorado State University
Dissertation: Carbohydrate Resources and Root Growth Potential in Selected Families of Loblolly Pine (**Pinus taeda** L.)

COLLEGE OF SCIENCES

DOCTOR OF PHILOSOPHY

Chemistry

Amruthur Venkatesan Satish — Bangalore, India
B.S., M.S., Bangalore University; M.S., Clemson University
Dissertation: Approaches to Synthesis of Taxane

Zoology

James McClintock Turbeville — Georgetown
B.A., Clemson University
Dissertation: Comparative Ultrastructure and Ontogeny of the Nemertine Circulatory System

DEGREES AWARDED BY MAJOR COURSES 1985-1986

Major Course	**Bachelors'**	**Masters'**	**Specialists'**	**Doctors'**
College of Agricultural Sciences				
Agricultural Economics	0	4	0	0
Agricultural Economics and Rural Sociology	17	0	0	0
Agricultural Education	8	10	0	0
Agricultural Mechanization and Business	12	0	0	0
Agriculture	0	10	0	0
Agronomy	6	5	0	0
Animal and Food Industries	0	13	0	0
Animal Industries	23	0	0	0
Animal Physiology	0	0	0	0
Animal Science	0	0	0	0
Applied Economics	0	0	0	3
Economic Biology	10	0	0	0
Entomology	0	1	0	4
Food Science	2	0	0	0
Horticulture	22	7	0	0
Nutrition	0	5	0	1
Nutritional Science	0	1	0	0
Plant Pathology	0	3	0	0
Plant Physiology	0	0	0	3
Poultry Science	0	0	0	0
Preprofessional Studies	3	0	0	0
Wildlife Biology	0	5	0	0
Total	103	64	0	11
College of Architecture				
Architecture	2	31	0	0
Building Science and Management	20	0	0	0
City and Regional Planning	0	5	0	0
Design	67	0	0	0
Fine Arts	0	6	0	0
Total	89	42	0	0
College of Commerce and Industry				
Accounting	91	11	0	0
Administrative Management	168	0	0	0
Business Administration	0	35	0	0
Economics	57	8	0	0
Economics and Political Science	1	0	0	0
Engineering Management	0	0	0	0
Financial Management	132	0	0	0
Industrial Management	46	27	0	6
Management	34	0	0	0
Management Science	0	0	0	2
Textile Chemistry	8	3	0	0
Textile and Polymer Science	0	0	0	1
Textile Management	3	0	0	0
Textile Science	4	4	0	0
Textile Technology	10	0	0	0
Total	554	88	0	9
College of Education				
Administration and Supervision	0	16	0	0
Counseling and Guidance Services	0	57	0	0
Early Childhood Education	26	0	0	0
Education	0	0	5	0
Elementary Education	73	34	0	0
Graphic Communications	17	0	0	0
Industrial Education	17	11	0	0
Reading	0	14	0	0
Science Teaching	16	0	0	0
Secondary Education	36	10	0	0
Special Education	0	21	0	0
Vocational and Technical Education	0	0	0	9
Total	185	163	5	9

Major Course	**Bachelors'**	**Masters'**	**Specialists'**	**Doctors'**
College of Engineering				
Agricultural Engineering	17	5	0	0
Bioengineering	0	9	0	0
Ceramic Engineering	13	6	0	0
Chemical Engineering	54	7	0	1
Civil Engineering	78	14	0	2
Computer Engineering	75	15	0	0
Electrical Engineering	133	25	0	2
Engineering	0	10	0	0
Engineering Analysis	5	0	0	0
Engineering Mechanics	0	1	0	0
Engineering Technology	78	0	0	0
Environmental Systems Engineering	0	4	0	0
Industrial Engineering	10	2	0	0
Mechanical Engineering	150	25	0	1
Total	613	123	0	6
College of Forest and Recreation Resources				
Forest Management	20	0	0	0
Forestry	0	9	0	0
Parks, Recreation, and Tourism Management	75	3	0	0
Recreation and Park Administration	0	2	0	0
Wood Utilization	5	0	0	0
Total	100	14	0	0
College of Liberal Arts				
Economics and French	1	0	0	0
English	51	9	0	0
English and History	1	0	0	0
English and Mathematical Sciences	1	0	0	0
History	12	4	0	0
History and Political Science	1	0	0	0
Modern Languages	12	0	0	0
Political Science	41	0	0	0
Political Science and Spanish	2	0	0	0
Psychology	32	0	0	0
Sociology	29	0	0	0
Total	183	13	0	0
College of Nursing				
Family Health Nursing	0	6	0	0
Nursing	90	0	0	0
Total	90	6	0	0
College of Sciences				
Biochemistry	5	0	0	0
Botany	1	2	0	0
Chemistry	7	5	0	1
Computer Information Systems	15	0	0	0
Computer Science	92	14	0	0
Geology	7	0	0	0
Mathematical Sciences	45	22	0	5
Medical Technology	6	0	0	0
Microbiology	21	0	0	0
Physics	8	6	0	1
Preprofessional Studies	3	0	0	0
Zoology	14	8	0	6
Total	224	57	0	13
Total Degrees Awarded 1985-1986	2,141	570	5	48
Grand Total Degrees Awarded 1985-1986	2,764			

TOTAL DEGREES AWARDED BY MAJOR COURSE, 1896-1986

Major Course

ASSOCIATES

Nursing	426
Total Associate Degrees Awarded	426

BACHELORS

Accounting	728
Administrative Management	2,446
Agricultural Chemistry	102
Agricultural Economics	486
Agricultural Economics and Rural Sociology	85
Agricultural Education	680
Agricultural Engineering	621
Agricultural Mechanization and Business	159
Agriculture	244
Agriculture and Animal Industry	80
Agriculture and Chemistry	69
Agronomy	837
Animal Industries	397
Animal Science	913
Applied Mathematics	34
Architectural Engineering	118
Architecture	737
Arts and Sciences	2,542
Bachelor of Science	3
Biochemistry	79
Biology	301
Botany	63
Building Construction	306
Building Science	35
Building Science and Management	128
Ceramic Engineering	456
Chemical Engineering	1,103
Chemistry	555
Chemistry Engineering	43
Chemistry and Geology	11
Chemistry and History	1
Civil Engineering	2,526
Community and Rural Development	11
Computer Engineering	184
Computer Information Systems	19
Computer Science	297
Dairy Science	427
Design	476
Early Childhood Education	593
Economic Biology	167
Economics	423
Economics and French	5
Economics and Political Science	4
Economics and Spanish	3
Education	242
Electrical Engineering	2,991
Elementary Education	1,493
Engineering Analysis	76
Engineering Industrial Education	70
Engineering Technology	625
English	455
English and History	9
English and Mathematical Sciences	1
English and Political Science	7
English and Psychology	1
English and Sociology	1
English and Spanish	2
Entomology	169
Financial Management	927
Food Science	111
Forest Management	379
Forestry	288
French and History	2
French and Political Science	6
French and Psychology	1
French and Spanish	1
General Science	359
Geology	117
German and History	1
German and Political Science	2
Graphic Communication	24
History	161
History and Political Science	2
History and Psychology	1
Horticulture	596
Industrial Education	945
Industrial Engineering	153
Industrial Management	1,905
Industrial Physics	56
Management	34
Mathematical Sciences	432
Mathematics	229
Mechanical and Electrical Engineering	489
Mechanical Engineering	2,772
Medical Technology	137
Metallurgical Engineering	20
Microbiology	485
Modern Languages	155
Nursing	878
Parks, Recreation, and Tourism Management	197
Physics	191
Plant Sciences	517
Political Science	493
Political Science and Psychology	1
Political Science and Sociology	1
Political Science and Spanish	3
Poultry Science	59
Prearchitecture	407
Premedicine	756
Preprofessional Studies	196
Psychology	541
Psychology and Spanish	1
Recreation and Park Administration	1,223
Science Teaching	323
Secondary Education	1,063
Sociology	285
Soils	9
Textile Chemistry	397
Textile Engineering	1,060
Textile Industrial Education	85
Textile Management	312
Textile Manufacturing	1,045
Textile Science	84
Textile Technology	198
Textiles	35
Veterinary Science	16
Vocational Agricultural Education	729
Weaving and Design	42
Wood Utilization	48
Zoology	450

DOUBLE MAJORS

Agricultural Chemistry and Arts and Sciences	1
Agricultural Chemistry and General Science	1
Agricultural Economics and Animal Husbandry	1
Agricultural Economics and Vocational Agricultural Education	1
Agricultural Engineering and Civil Engineering	2
Agricultural Engineering and Electrical Engineering	1
Agricultural Engineering and Mechanical Engineering	1

Agronomy and Agricultural Education	1
Agronomy and Vocational Agricultural Education	4
Animal Husbandry and Agricultural Education	3
Animal Husbandry and Ceramic Engineering	1
Animal Husbandry and Dairy	2
Animal Husbandry and Industrial Management	1
Animal Husbandry and Vocational Agricultural Education	5
Architectural Engineering and Architecture, Five Year	1
Architecture and Architectural Engineering	11
Architecture and Civil Engineering	1
Architecture, four-year, and Architecture, five-year	18
Architecture, four-year and Mechanical Engineering	1
Arts and Sciences and Agricultural Economics	1
Chemical Engineering and Chemistry and Chemistry Engineering	3
Chemical Engineering and Chemistry Engineering	1
Chemistry and Agricultural Chemistry	1
Chemistry and Chemical Engineering	1
Chemistry and Chemistry Engineering	1
Chemistry and General Science	1
Chemistry and Industrial Physics	1
Civil Engineering and Architecture	1
Civil Engineering and Chemistry and Geology	2
Civil Engineering and Electrical Engineering	1
Civil Engineering and Industrial Physics	1
Civil Engineering and Mechanical Engineering	1
Electrical Engineering and Applied Mathematics	1
Electrical Engineering and Industrial Physics	1
Electrical Engineering and Mechanical Engineering	17
Electrical Engineering and Textile Engineering	1
Entomology and Architecture, five-year	1
Entomology and Premedicine	1
General Science and Ceramic Engineering	1
General Science and Education	1
General Science and Electrical Engineering	1
Horticulture and Agronomy	1
Horticulture and Architectural Engineering	1
Horticulture and Civil Engineering	1
Industrial Education and Architecture	1
Industrial Education and Electrical Engineering	1
Industrial Education and Forestry	1
Industrial Engineering and Mechanical Engineering	1
Mechanical Engineering and Textile Engineering	4
Poultry and Vocational Agricultural Education	1
Premedicine and Arts and Sciences	1
Premedicine and Textile Chemistry	2
Textile Chemistry and Civil Engineering	1
Textile Chemistry and Textile Manufacturing	1
Textile Engineering and Civil Engineering	1
Textile Engineering and Mechanical and Electrical Engineering	1
Textile Engineering and Textile Industrial Education	1
Textile Engineering and Textile Manufacturing	1
Textile Engineering and Weaving and Designing	1
Textile Manufacturing and Mechanical Engineering	1
Total Bachelors' Degrees Awarded	48,194

MASTERS

Accounting	20
Agricultural Economics	141
Agricultural Education	243
Agricultural Engineering	63
Agriculture	186
Agronomy	78
Animal and Food Industries	67
Animal Science	48
Architecture	362
Bacteriology	6
Biochemistry	32
Bioengineering	99
Botany	32
Business Administration	458
Ceramic Engineering	112
Chemical Engineering	134
Chemistry	147
City and Regional Planning	140
Civil Engineering	169
Computer Engineering	39
Computer Science	52
Dairy Science	24
Economics	69
Education	1,325
Administration and Supervision	368
Counseling and Guidance Services	86
Elementary Education	1,100
Personnel Services	682
Reading	348
Secondary Education	228
Special Education	49
Education Specialist	135
Electrical Engineering	222
Engineering	223
Engineering Mechanics	24
English	185
Entomology	139
Environmental Systems Engineering	160
Family Health Nursing	26
Fine Arts	48
Forestry	116
History	37
Horticulture	125
Industrial Education	244
Industrial Engineering	8
Industrial Management	96
Management	152
Materials Engineering	14
Mathematical Sciences	228
Mathematics	170
Mechanical Engineering	200
Microbiology	93
Nuclear Science	3
Nursing	22
Nutrition	54
Nutritional Science	61
Parks, Recreation, and Tourism Management	3
Physics	116
Plant Pathology	40
Plant Physiology	2
Poultry Science	27
Recreation and Park Administration	119
Systems Engineering	42

Textile Chemistry	83
Textile Industrial Education	1
Textile Science	59
Textiles	1
Water Resources Engineering	52
Wildlife Biology	66
Zoology	143
Total Masters' Degrees Awarded	10,446
DOCTORS	
Agricultural Economics	17
Agricultural Engineering	13
Agronomy	21
Animal Physiology	32
Applied Economics	19
Biochemistry	8
Bioengineering	15
Chemical Engineering	36
Chemical Physics	3
Chemistry	112
Civil Engineering	24
Electrical Engineering	31
Engineering Management	36
Engineering Mechanics	14
Entomology	63
Environmental Systems Engineering	28
Forestry	2
Industrial Engineering	2
Industrial Management	8
Management Science	19
Materials Engineering	3
Mathematical Sciences	37
Mathematics	36
Mechanical Engineering	18
Microbiology	6
Nutrition	22
Physics	82
Plant Pathology	19
Plant Physiology	31
Systems Engineering	8
Textile and Polymer Science	20
Vocational and Technical Education	9
Water Resources Engineering	1
Zoology	42
Total Doctors' Degrees Awarded	837
Grand Total Degrees Awarded 1896-1986	59,903

ENROLLMENT BY MAJORS AND ACADEMIC CLASSIFICATION
Fall Semester 1986

Major Course	Freshmen	Sophomores	Juniors	Seniors	Unclassified Undergraduates	Postgraduates	Postbaccalaureate	Unclassified Graduates	Masters	Doctors	Total
College of Agricultural Sciences											
Agricultural Business	2	1	2	6	0	0	0	0	0	0	11
Agricultural Economics	0	0	0	1	0	0	0	0	14	0	15
Agricultural Education	4	2	4	10	0	0	0	0	17	0	37
Agricultural Engineering	5	8	9	8	0	0	0	0	5	14	49
Agricultural Industries	14	1	6	3	0	0	0	0	0	0	24
Agricultural Mechanization and Business	8	7	11	8	0	0	0	0	1	0	35
Agriculture	5	0	0	0	0	0	0	0	0	0	5
Agronomy	3	3	3	4	0	0	0	0	16	13	42
Animal and Food Industries	0	0	0	0	0	0	0	0	25	0	25
Animal Industries	0	0	0	0	0	0	0	0	0	0	0
Animal Physiology	0	0	0	0	0	0	0	0	0	6	6
Animal Science	19	8	12	16	0	1	0	0	2	0	58
Applied Economics	0	0	0	0	0	0	0	0	0	18	18
Community and Rural Development	3	5	0	0	0	0	0	0	0	0	8
Dairy Science	4	0	7	8	0	0	0	0	2	0	21
Economic Biology	2	0	0	0	0	0	0	0	0	0	2
Economic Zoology	18	8	11	6	0	0	0	0	0	0	43
Entomology	2	1	4	2	0	0	0	0	10	12	31
Food Science	9	7	10	8	0	0	0	0	0	0	34
Food Technology	0	0	0	0	0	0	0	0	0	2	2
Horticulture	0	1	1	0	0	0	0	0	12	0	14
(Fruit and Vegetable)	3	1	0	5	0	1	0	0	0	0	10
(Ornamental)	17	8	13	21	1	0	0	0	0	0	60
(Turfgrass)	4	2	1	2	0	0	0	0	0	0	9
Nutrition	0	0	0	0	0	0	0	0	15	9	24
Packaging Science	2	0	0	0	0	0	0	0	0	0	2
Plant Pathology	0	0	0	0	0	0	0	0	8	6	14
Plant Physiology	0	0	0	0	0	0	0	0	0	8	8
Plant Sciences	0	0	0	0	0	0	0	0	0	0	0
Poultry Science	5	0	4	1	0	0	0	0	1	0	11
Wildlife Biology	0	0	0	0	0	0	0	0	22	1	23
Nondegree	0	0	0	0	0	0	0	9	0	0	9
Total	129	63	98	109	1	2	0	9	150	89	650
College of Architecture											
Architecture	0	0	0	0	0	3	7	1	61	0	72
Building Science and Management	12	24	30	11	0	0	0	0	0	0	77
City and Regional Planning	0	0	0	0	0	0	0	0	33	0	33
Design (BA)											
Architecture Studies	32	16	19	20	0	0	0	0	0	0	87
City and Regional Planning	2	1	0	0	0	0	0	0	0	0	3
Landscape Architecture Studies	0	0	0	0	0	0	0	0	0	0	0
Visual Arts Studies	7	5	1	3	0	0	0	0	0	0	16
Design (BS)											
Architecture Studies	68	45	55	62	0	2	0	0	1	0	233
City and Regional Planning Studies	0	0	0	0	0	0	0	0	0	0	0
Landscape Architecture Studies	3	1	0	2	0	0	0	0	0	0	6
Visual Arts Studies	0	0	0	0	0	0	2	0	17	0	19
Nondegree	0	0	0	0	0	0	0	0	0	0	0
Total	124	92	105	98	0	5	9	1	112	0	546

Major Course	**Freshmen**	**Sophomores**	**Juniors**	**Seniors**	**Unclassified Undergraduates**	**Postgraduates**	**Postbaccalaureate**	**Unclassified Graduates**	**Masters**	**Doctors**	**Total**
College of Commerce and Industry											
Accounting	136	103	140	99	0	2	2	0	14	0	496
Business Administration	0	0	0	0	0	0	1	0	7	0	8
Economics (BA)	27	5	8	8	0	0	0	0	0	0	48
Economics (BS)	18	25	13	39	0	0	0	0	13	0	108
Financial Management	146	179	162	150	0	0	0	0	0	0	637
Industrial Management	39	55	58	80	0	0	1	0	44	36	313
Management	241	202	217	226	0	0	0	0	0	0	886
(Occupational Safety and Health)	5	5	5	10	0	0	0	0	0	0	25
Management Science	0	0	0	0	0	0	0	0	1	4	5
Marketing	26	8	16	2	0	0	0	0	0	0	52
Textile Chemistry	5	5	2	5	0	0	0	0	1	0	18
Textile and Polymer Science	0	0	0	0	0	0	0	0	0	3	3
Textile Management	24	16	8	4	0	0	0	0	0	0	52
Textile Science	4	0	1	4	0	0	0	0	7	0	16
Textile Technology	0	0	3	6	0	0	0	0	0	0	9
Nondegree	0	0	0	0	0	0	0	5	0	0	5
Total	671	603	633	633	0	2	4	5	87	43	2,681
College of Education											
Administration and Supervision	0	0	0	0	0	0	0	0	22	0	22
Counseling and Guidance Services	0	0	0	0	0	0	1	1	114	0	116
Early Childhood Education	43	28	36	44	0	1	0	0	0	0	152
Education	0	0	0	0	0	1	0	0	0	0	1
Education Specialist	0	0	0	0	0	0	0	0	14	0	14
Elementary Education	104	64	53	68	0	2	0	0	37	0	328
Graphic Communications	65	47	36	23	0	0	0	0	0	0	171
Industrial Education	1	0	0	0	0	0	0	0	18	0	19
Education for Industry	6	12	10	20	0	0	0	0	0	0	48
Industrial Technology Education	7	5	9	10	0	0	0	0	0	0	31
Vocational and Technical Education	0	0	0	1	0	0	0	0	0	0	1
Reading	0	0	0	0	0	0	0	1	23	0	24
Science Teaching	0	0	0	0	0	1	0	0	0	0	1
Biological Sciences	5	5	6	9	0	1	0	0	0	0	26
Chemistry	1	0	1	1	0	0	0	0	0	0	3
Earth Science	1	2	2	2	0	1	0	0	0	0	8
Mathematical Sciences	9	9	8	10	0	0	0	0	0	0	36
Physical Sciences	1	3	0	2	0	0	0	0	0	0	6
Secondary Education	0	0	0	0	0	0	0	0	0	0	0
Economics	2	1	0	0	0	1	0	0	0	0	4
English	10	14	15	21	0	4	0	0	7	0	71
French	3	2	2	3	0	0	0	0	0	0	10
German	1	0	0	0	0	0	0	0	0	0	1
History	7	11	8	13	1	0	0	0	3	0	43
Mathematical Sciences	23	7	14	14	0	1	0	0	10	0	69
Natural Sciences	5	1	5	4	0	0	0	0	2	0	17
Political Science	2	1	0	2	0	0	0	0	0	0	5
Psychology	8	10	3	2	0	1	0	0	0	0	24
Sociology	1	0	1	2	0	1	0	0	0	0	5
Spanish	2	0	0	0	0	0	0	0	0	0	2
Special Education	0	0	0	0	0	0	0	0	25	0	25
Vocational and Technical Education	0	0	0	0	0	0	0	1	0	20	21
Nondegree	4	0	0	0	1	6	0	107	0	0	118
Total	311	222	209	251	2	21	1	110	275	20	1,422

Major Course	**Freshmen**	**Sophomores**	**Juniors**	**Seniors**	**Unclassified Undergraduates**	**Postgraduates**	**Postbaccalaureate**	**Unclassified Graduates**	**Masters**	**Doctors**	**Total**
College of Engineering											
Bioengineering	0	0	0	0	0	0	1	0	31	3	35
Ceramic Engineering	0	18	21	23	0	2	0	0	10	0	74
Chemical Engineering	2	40	33	67	0	2	1	0	19	4	168
Civil Engineering	0	55	68	94	0	2	0	0	36	21	276
Computer Engineering	4	41	102	108	0	1	1	0	31	3	291
Electrical Engineering	8	97	182	182	0	9	1	0	76	25	580
Engineering	0	0	0	0	0	0	0	0	0	0	0
Engineering Analysis	0	2	0	6	0	0	0	0	0	0	8
Engineering Mechanics	0	0	0	0	0	0	0	0	4	5	9
Engineering Technology	0	0	7	59	0	1	0	0	0	0	67
Environmental Systems Engineering	0	0	0	0	0	0	1	0	46	10	57
Industrial Engineering	1	21	46	29	0	2	0	0	18	11	128
Mechanical Engineering	7	97	153	180	0	10	0	0	52	14	513
Freshman Engineering	935	208	9	0	1	3	0	0	0	0	1,156
Nondegree	0	0	0	0	0	0	0	7	0	0	7
Total	957	579	621	748	1	32	5	7	323	96	3,369
College of Forest and Recreation Resources											
Forest Management	39	11	16	15	2	0	0	0	0	0	83
Forestry	0	0	0	0	0	0	0	0	19	12	31
Parks, Recreation, and Tourism Management	110	77	73	78	0	0	0	0	25	4	367
Wood Utilization	5	2	4	7	0	0	0	0	0	0	18
Nondegree	0	0	0	0	0	0	0	1	0	0	1
Total	154	90	93	100	2	0	0	1	44	16	500
College of Liberal Arts											
English	55	24	40	44	0	0	1	0	39	0	203
French	10	12	8	2	0	0	0	0	0	0	32
German	4	1	1	2	0	0	0	0	0	0	8
History	15	9	10	13	0	0	0	0	11	0	58
Liberal Arts	128	18	4	0	0	0	0	0	0	0	150
Political Science	79	45	44	41	0	1	0	0	0	0	210
Psychology	98	44	59	35	0	0	0	0	0	0	236
Sociology	21	16	21	19	0	0	0	0	0	0	77
Spanish	4	2	4	4	0	0	0	0	0	0	14
Nondegree	0	0	0	0	0	0	0	5	0	0	5
Total	414	171	191	160	0	1	1	5	50	0	993
College of Nursing											
Family Health Nursing	0	0	0	0	0	0	0	1	41	0	42
Nursing	70	51	83	107	0	5	0	0	0	0	316
Nondegree	0	0	0	0	0	0	0	5	0	0	5
Total	70	51	83	107	0	5	0	6	41	0	363

Major Course	**Freshmen**	**Sophomores**	**Juniors**	**Seniors**	**Unclassified Undergraduates**	**Postgraduates**	**Postbaccalaureate**	**Unclassified Graduates**	**Masters**	**Doctors**	**Total**
College of Sciences											
Biochemistry	28	13	20	9	0	0	0	0	7	5	82
Biological Science (BA)	5	0	0	0	0	0	0	0	0	0	5
Biological Science (BS)	29	11	0	0	0	0	0	0	0	0	40
Botany	0	0	0	0	0	0	0	0	9	0	9
Chemistry (BA)	1	0	3	1	0	0	0	0	0	0	5
Chemistry (BS)	18	12	10	8	0	0	0	0	34	25	107
Computer Information Systems	23	15	30	37	1	0	0	0	0	0	106
Computer Science	87	38	65	82	2	4	1	1	86	8	374
Geology (BA)	2	0	0	2	0	0	0	0	0	0	4
Geology (BS)	0	3	3	7	0	0	0	0	0	0	13
Mathematical Sciences (BA)	9	6	3	5	0	0	0	0	0	0	23
Mathematical Sciences (BS)	33	26	50	52	0	0	0	0	63	19	243
Medical Technology	10	8	8	5	0	0	0	0	0	0	31
Microbiology	16	24	32	27	0	3	0	0	32	12	146
Physics (BA)	0	0	0	0	0	0	0	0	0	0	0
Physics (BS)	13	4	6	7	0	0	0	0	12	16	58
Prepharmacy	12	13	1	0	0	0	0	0	0	0	26
Prephysical Therapy	24	14	6	0	0	0	0	0	0	0	44
Preprofessional Health Studies	59	18	8	0	0	0	0	0	0	0	85
Zoology (BA)	1	1	0	1	0	0	0	0	0	0	3
Zoology (BS)	7	19	23	27	0	0	0	0	18	28	122
Nondegree	0	0	0	0	0	0	0	7	0	0	7
Total	377	225	268	270	3	7	1	8	261	113	1,533
Nondegree	15	5	1	6	0	23	0	0	0	0	50
Special Status	0	0	0	0	45	0	0	0	0	0	45
Total	15	5	1	6	45	23	0	0	0	0	95
Campus Total	3,222	2,101	2,302	2,482	54	98	21	152	1,343	377	12,152
Clemson-Furman (MBA)											149
Clemson—Greenville TEC											69
Institutes											692
Total Off Campus											910
Grand Total											13,062

ENROLLMENT BY STATE AND COUNTRY

Fall Semester, 1986-1987

State	
Alabama	48
Alaska	2
Arizona	3
Arkansas	9
California	34
Colorado	7
Connecticut	74
Delaware	65
District of Columbia	2
Florida	459
Georgia	516
Hawaii	6
Idaho	2
Illinois	60
Indiana	49
Iowa	6
Kansas	4
Kentucky	30
Louisiana	22
Maine	6
Maryland	263
Massachusetts	51
Michigan	39
Minnesota	7
Mississippi	16
Missouri	32
Montana	6
Nebraska	6
Nevada	1
New Hampshire	14
New Jersey	328
New Mexico	4
New York	226
North Carolina	545
North Dakota	1
Ohio	140
Oklahoma	6
Oregon	3
Pennsylvania	195
Puerto Rico	6
Rhode Island	5
South Carolina	
Abbeville	48
Aiken	247
Allendale	17
Anderson	773
Bamberg	19
Barnwell	42
Beaufort	80
Berkeley	143
Calhoun	27
Charleston	448
Cherokee	108
Chester	55
Chesterfield	32
Clarendon	34
Colleton	38
Darlington	89
Dillon	25
Dorchester	183
Edgefield	20
Fairfield	38
Florence	167
Georgetown	50
Greenville	1,119
Greenwood	157
Hampton	37
Horry	135
Jasper	10
Kershaw	107
Lancaster	62
Laurens	93
Lee	33
Lexington	335
Marion	39
Marlboro	20
McCormick	7
Newberry	51
Oconee	486
Orangeburg	151
Pickens	972
Richland	371
Saluda	44
Spartanburg	452
Sumter	153
Union	25
Williamsburg	34
York	243
South Carolina	7,819
South Dakota	1
Tennessee	124
Texas	41
Utah	7
Vermont	8
Virgin Islands	1
Virginia	265
Washington	4
West Virginia	44
Wisconsin	18
Wyoming	5
	11,635

Countries	
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Austria	1
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Belgium	1
Bolivia	1
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Cameroon	1
Canada	13
Chile	1
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Dominica	1
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Affirmative Action Director of Human Resources	E103 Martin Hall	656-3181
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Clemson, South Carolina 29631